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ABSTRACT

The objectives of this study were to: (1) develop a rationale and structure for quantifying individual demands of people for vocational education, (2) demonstrate a method of quantifying these demands, and (3) develop a set of guidelines for administratores at State and local levels for determining individual demand for vocational education. Alternative data collection procedures were developed and tested on a pilot basis. The design for the pilot tests is presented in detail, including the area chosen, statistical population, sampling procedures, questions to be asked, and how the questions were to be asked. Results of the pilot test allowed conclusions about the validity and reliability of the data as well as the effectiveness of the procedures. On the basis of the conclusions from the test, recommendations are presented in the form of a guide for use by local education agencies or State departments of education in conducting a determination of individual demand for vocational education. (MF)

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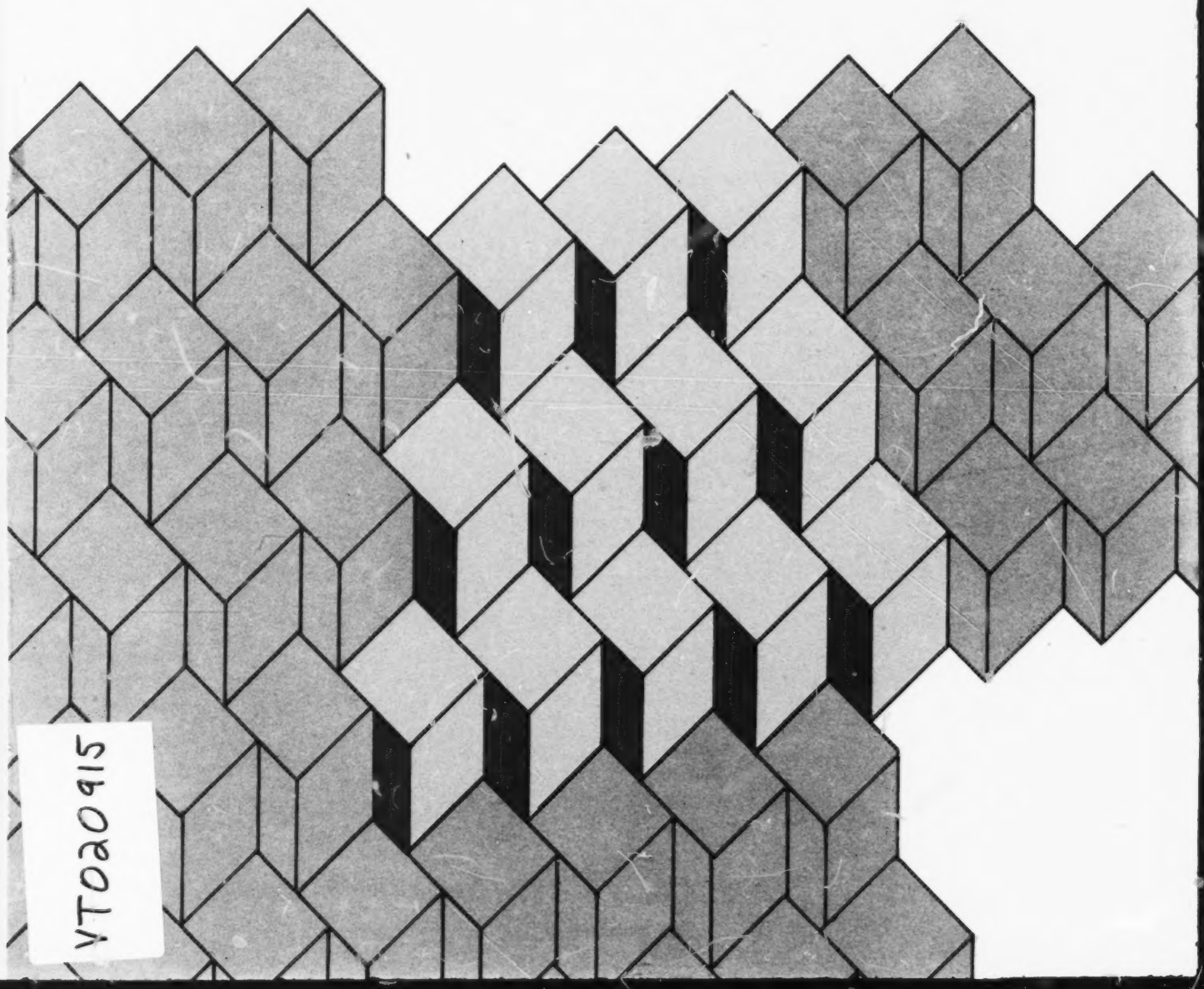
INDIVIDUAL DEMAND FOR VOCATIONAL EDUCATION: STRUCTURE AND DETERMINATION



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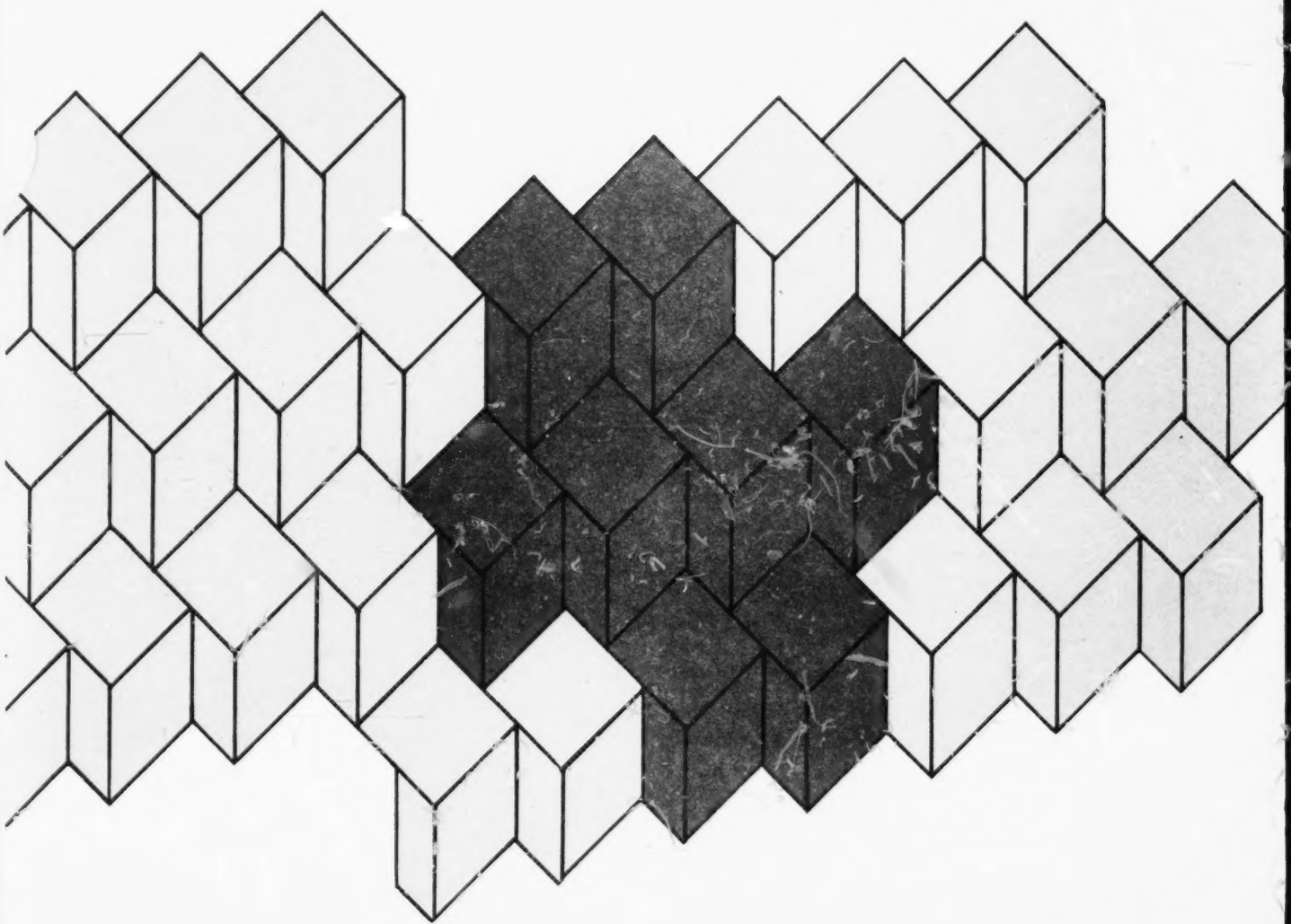
INDIVIDUAL DEMAND FOR VOCATIONAL EDUCATION:

STRUCTURE AND DETERMINATION

by George Copa, Edgar Persons and Paul Thomas

February, 1973



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PREFACE

This research study was initiated in 1970 as a response to the expressed needs of the Minnesota State Department of Education, Division of Vocational Education and the Minnesota State Advisory Council for Vocational Education. The specific objective was to describe a structure for assessing the needs of people for vocational education in Minnesota and to pilot test a means of determining these needs.

Many persons contributed to the resulting report. Special acknowledgment is given to our colleagues in the Minnesota Research Coordinating Unit: Jerome Moss, Jr., Brandon Smith, and Luther Saunders; Melvin Johnson, Director, Program Planning Section, Division of Vocational-Technical Education, Minnesota State Department of Education; and Jerry Enright, Executive Secretary, Minnesota State Advisory Council for Vocational Education for their contributions to the formulation of a structure for assessing the demands of individuals for vocational education. Also, the pilot test could not have been accomplished without the help of many citizens of Steele County, Minnesota, especially Mrs. JoAnne Havelka who was invaluable as an on-site trouble shooter during the test. The authors, however, take full responsibility for what is said in the following report.

SUMMARY

Planners of vocational education face a dilemma in stating their objectives. The dilemma arises from the fact that vocational educators are encouraged on one hand to use the demands of industry to determine the amount and type of vocational education to be provided and on the other to serve the needs and interests of all the people (individual demand). The objectives of this study were: (1) to develop a rationale and structure for quantifying individual demands of people for vocational education; (2) to demonstrate a method of quantifying those demands; and (3) to develop a set of guidelines for administrators at state and local levels for determining individual demand for vocational education.

The rationale and structure was reviewed by the Division of Vocational and Technical Education, Minnesota State Department of Education, and the Minnesota Advisory Council for Vocational Education. The structure consists of quantification of individual demand for vocational education at four levels:

(1) Population requiring vocational education
(2) Population demanding vocational education
(3) Population demanding public sponsored vocational education
(4) Needs of the population demanding vocational education

A county in Minnesota was selected to demonstrate methods of collecting information necessary to quantify individual demand. A random sampling technique for sampling individuals in a given geographic area was developed. Eleven different methods of collecting the information were evaluated in terms of their effectiveness and efficiency.

Based on the results of this study a set of guidelines for state and local administrators of vocational education were developed. The guidelines were directed at how an administrator could actually determine the individual demand in the geographic area of his concern. The guidelines attempt to answer the following questions:

(1) Who should be asked about vocational education needs?
(2) If one cannot collect data from everyone, how can a representative sample be secured?
(3) What kinds of questions are appropriate to ask?
(4) What methods are most appropriate for collecting the data?
(5) What percent response can be anticipated from those surveyed?
(6) What confidence can you have that the data will represent the population surveyed?
(7) How can the data be assembled to communicate to others what the vocational education needs are in your area?
(8) What steps should be taken to assure that the study is administered in a well organized manner?
(9) How can you calculate what the study will cost?

Chapter I
STRUCTURE OF INDIVIDUAL DEMAND FOR VOCATIONAL EDUCATION

CONCEPTUAL STRUCTURE

Planners of vocational education programs face a dilemma in stating their objectives. The dilemma is made explicit by Lindman and Kurth in stating that vocational educators are encouraged

> On the one hand to use the estimates of industry demands for manpower to determine the amount and kind of vocational and technical education to provide. On the other hand he is expected to use estimates of social demand for education from which to gauge the need for programs and the expected participation.[1]

However, the dilemma arises only if industry demands are different than social demands. To assess if in fact this difference exists, industry demands and social demands must be measured in quantifiable terms. The objective of this report is to present a structure for quantifying the social demands of individuals for vocational education and to demonstrate a method of quantifying these demands.

The decision to look at individual demand was predicated on a recommendation of the Minnesota State Advisory Council for Vocational Education to the State Legislature. The recommendation is that "the Minnesota Legislature give priority to a review and redirection of our state's public policy for education to better serve 'people needs.'"[2] Toward this end, the structure which is proposed quantifies individual demand at four levels of specificity. These levels are:

I. The population requiring vocational education.

II. The population demanding vocational education.

III. The population demanding public sponsored vocational education.

IV. The needs of the population demanding vocational education.

Level I refers to the population "requiring" vocational education. The word "requiring" is used because it implies a "should be" decision made for the person being categorized. In Level II and III the population is those

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[1] Lindman, Erick L. and Kurth, Edwin L. "Dimensions of Need for Vocational Education" in Dimensions of Educational Needs, edited by Roe L. John, Kern Alexander, and Richard Rossmiller, National Education Finance Project: Gainsville, Florida, Volume 1, 1969, p. 132.

[2] Report of the Minnesota State Advisory Council for Vocational Education-1970. Minnesota State Advisory Council for Vocational Education: St. Paul, 1970, p. 1.

demanding' vocational education or public sponsored vocational education, respectively. "Demanding" is used because it implies a "what is" decision made by the person being categorized. The distinction between requiring and demanding is based on two assumptions, which are: (a) there are people who require vocational education but may not demand it, and (b) society's demands for vocational education may differ from the sum of individuals' demands. Under the first assumption, discrepancies between require and demand may occur because of lack of information on training or occupations; under the second assumption, discrepancies might occur because of differences in the objectives of individuals versus society as a whole. The point is that a discrepancy can exist and vocational education planners must decide how they are going to cope with it--an issue not treated specifically in this report.

Level IV describes the expressed needs of people demanding vocational education. This information lends itself to the actual planning and development of vocational education programs. In summary, as one proceeds from Level I to Level IV, more types of information, as well as information in greater detail, is required.

Level I: Population Requiring Vocational Education

Since this population is described by the word "requiring," the number of people in the population is decided by society in terms of what "should be." This decision is not as difficult if the population is first divided into the categories of people for which federal vocational education funds can be used as stipulated in the Vocational Amendments of 1968.[3] These categories are:

A. Elementary school students.

B. High school students.

C. Persons who have completed or left high school and who are available for study in preparation for entering the labor market.

D. Persons who have already entered the labor market.

E. Persons who have academic, socioeconomic, or other handicaps that prevent them from succeeding in the regular vocational education program (except for handicapped persons defined as those who are mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, crippled or health impaired persons who by reason thereof require special education and related services).

F. Handicapped persons who because of their handicapping conditions cannot succeed in the regular vocational education program without special educational assistance or who require a modified vocational educational program.

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[3] "Amendments to the Vocational Education Act of 1963," Public Law 90-576, 90th Congress, H.R. 18366, October 16, 1968, p. 18.

The Vocational Amendments further define vocational education as a training program (including field or laboratory work and remedial or related academic and technical instruction) designed to prepare individuals for: (a) gainful employment as semiskilled or skilled workers or technicians or subprofessionals and (b) enrollment in advanced technical education programs. This definition excludes programs to prepare individuals for employment in occupations which are generally considered professional or programs which require a baccalaureate or higher degree.[4]

By defining the use of funds as stated above, the Amendments of 1968 eliminate the persons who are below elementary school age and who are fully retired from employment. Further, the definition of vocational education excludes those employed in the professions or training for the professions, as well as those requiring less training than is required for semi-skilled occupations, from the population requiring vocational education.

Although the above categories of the population can be derived from the Amendments, they are difficult to operationalize in the actual classification of persons. Operational definitions of "who fits into each of the six funding categories" must be made before the population can be defined in a concrete manner. The proposed operational definitions are as follows:

A. Elementary school students: Persons attending full-time grades 1 through 8. (This definition can be revised to include preschool and kindergarten students if they were to become part of vocational education's responsibility.)

B. High school students: Persons attending full-time grades 9 through 12.

C. Persons who have completed high school and who are available for study in preparing for entering the labor market: Persons who have completed grade 12 or who dropped out of school before completing grade 12 and who do not have a full-time wage paying job.

D. Persons who have already entered the labor market: Persons who have a full-time wage paying job.

E. Persons who have academic, socioeconomic, or other handicaps that prevent them from succeeding in the regular vocational education program: These people will be referred to as the disadvantaged and will be classified under three headings: (1) educationally, (2) economically, and (3) multiple. It is recognized that disadvantagement may be classified under other subheadings, such as culturally, socially and combinations of these. However, it is assumed that all other disadvantagements either lead to or are caused by economic and/or educational disadvantagement.

   1. Educationally disadvantaged persons are defined as:

      a. Anyone who had dropped out of school before the completion of the twelfth grade.

      b. Anyone who is presently enrolled in a school but is two or more grade levels behind in reading, mathematical, or general achievement skills.

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[4] Ibid., p. 6 and 7.

2. Economically disadvantaged persons are defined as a person whose annual net income in relation to family size and location does not exceed the following criteria as defined by the United States Department of Labor, Manpower Administration:

FAMILY SIZE	INCOME NON-FARM	INCOME FARM
1	$1600	$1100
2	2100	1500
3	2600	1800
4	3300	2300
5	3900	2800
6	4400	3100
7	4900	3400
8	5400	3800
9	5900	4100
10	6400	4500
11	6900	4800
12	7400	5200
13 or more	7900	5500

The relevant operational definitions used by the Manpower Administration are:[5]

a. A family consists of one or more persons living in a single household who are related to each other by blood, marriage or adoption. All persons living in one household who are related to each other are regarded as one family. An individual living alone or in group quarters is considered a family.

b. Family income is net cash income from all sources by all family members, excluding capital gains and losses as well as one-time unearned income receipts such as insurance payments and gifts. Non-cash income, such as wages received in the form of food or housing, or the value to owner-occupied property, is excluded by the definition.

c. Farm or non-farm family income will be determined by location of residence as determined by the 1960 census definition. Farm is the location category of persons living in rural territory (outside the corporate limits of a city of 2,500 or more, or outside of an urbanized area contiguous to such a city) on places of 10 or more acres from which sales of farm products amounted to $50 or more, or on places of less than 10 acres from which sales of farm products amounted to $250 or more.

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[5]"Manpower Administrative Order No. 1-69." U.S. Department of Labor, Manpower Administration: Washington, D.C. January 12, 1969, p. 2-3.

3. Multiple disadvantaged persons will be defined as anyone who qualified under both educational and economical disadvantagement.

F. Handicapped persons who because of their handicapping condition cannot succeed in regular vocational education programs without special education, assistance, or who require a modified vocational program:

Persons who are:[6]

1. Mentally retarded

a. Educable mentally handicapped children are those children who, because of retarded intellectual development, as determined by individual psychological examinations and instructional consideration, are incapable of being educated profitably and effectively through ordinary classroom instruction, but who may be expected to benefit from special educational methods of instruction, materials and curriculum designed to make them economically useful and socially adjusted.

An intelligence quotient of 50 to 80 is considered as the broad range of educability; however, the recommendations of the psychologist and special education supervisors, based on referral information, the intelligence test information, and an assessment of the child's functioning in the test situation itself are the essential factors for placement.

b. Trainable retarded

Those children who, because of retarded mental development, are unable to profit from the program of instruction for the educable mentally handicapped but who have potentialities for learning self-care, social adjustment in the family and neighborhood, and economic usefulness in the home or in a sheltered environment.

This definition assumes that there is also a group of children who are below this degree of trainability and who are considered totally dependent and, therefore, not eligible for the program.

An intelligence quotient of between 35 and 50 is considered as the broad range of trainability; however, the recommendation of the psychologist and special education supervisor, based on referral information, the intelligence test information, and an assessment of the child's functioning in the test and school situations are the essential factors for placement.

2. Hard of hearing and deaf

a. Hard of hearing: Those in whom the sense of hearing, although defective, is functional with or without a hearing aid.

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[6]"Minnesota State Plan for Vocational-Technical Education," Minnesota State Department of Education: St. Paul, July 1, 1970, p. 189-91.

b. Deaf: Those in whom the sense of hearing is nonfunctional for the ordinary purposes of life. This general group is made up of two distinct classes based entirely on the time of the loss of hearing. The congenitally deaf - those born deaf - and the adventiously deaf - those born with normal hearing, but in whom the sense of hearing becomes nonfunctional later through illness or injury.

3. Speech impaired (speech handicapped)

   a. Those children who have functional (nonorganic) defects in articulation

   b. Children who stutter

   c. Children with organic speech defects resulting from cleft palate, cerebral palsy, impaired hearing or other causes

4. Visually handicapped

   a. Blind children are those who have a total loss of vision or those who are considered educationally blind. For some purposes, the blind child is defined as one whose vision is 20/200 or less after correction or treatment. For other purposes, definition and reports will need to be in terms of need for braille instructional methods and materials.

   b. Partially sighted children are generally those whose vision ranges between 20/200 and 20/70 in the better eye, after correction, and who, in the judgement of the professional authorities, need special education services. This group may include children suffering from degenerative eye defects.

5. Seriously emotionally disturbed

   a. Learning disabled: (Definition of the U.S. Office of Education, Bureau of Education for the Handicapped, 1969)

   b. Seriously emotionally disturbed: (Definition of the U.S. Office of Education, Bureau of Education for the Handicapped, 1969)

   c. Socially maladjusted: Juvenile offenders, incarcerated delinquents or those children and adults who show other forms of special behavior problems.

6. Physically impaired

   a. Crippling due to infection such as bone tuberculosis, osteomoyelitis, poliomelitis or other infections

b. Cerebral palsy, which is a disability of nerves and muscles caused by damage to certain centers of the brain that govern muscular control

c. Cardiopathic conditions such as congenital heart conditions and those resulting from rheumatic fever

d. Congenital anomalies such as club foot, cleft lip and palate, spina bifida and others

e. Crippling resulting from traumatic conditions such as burns, fractures or other accidents

f. Other conditions such as oeteogensis imperfects, muscular dystrophy, hemophilia and central nervous disorders without physical impairment (brain damage)

The proposed operational definition of handicapped further eliminates from the population requiring vocational education those persons who are more severely handicapped than is stated.

The function of level I in defining the individual demand for vocational education would be to derive an estimate of (a) the number of persons in each of the six categories, and (b) the proportion of persons in each category who actually require vocational education.

Of the six categories implied, only categories one through four are mutually exclusive. Categories five and six contain persons who also fit into one of the first four categories. The categories of disadvantaged and handicapped are mutually exclusive in that if the person is handicapped he is not considered in the disadvantaged category. These relationships are shown in Table 1.

After each of the X's in Table 1 are estimated, a decision must be made as to what proportion of each X should be receiving vocational education. These proportions can be independent from one X to another. Table 2 portrays a symbolic set of proportions.

Application of the proportions shown in Table 2 to the populations shown in Table 1 results in an estimate of the population requiring vocational education. This calculation is shown in Table 3. In this report, no attempt will be made to actually calculate the number of individuals in the population requiring vocational education.

TABLE 1

SIZE AND RELATIONSHIP OF CATEGORIES WHO MAY REQUIRE VOCATIONAL EDUCATION

i \ j	(1) Regular	(2) Disadvantaged	(3) Handicapped	Total
(1) Elementary students	X_{11}	X_{12}	X_{13}	$X_{1.}$
(2) High school students	X_{21}	X_{22}	X_{23}	$X_{2.}$
(3) High school graduates or dropouts and not employed	X_{31}	X_{32}	X_{33}	$X_{3.}$
(4) Employed	X_{41}	X_{42}	X_{43}	$X_{4.}$
Total	$X_{.1}$	$X_{.2}$	$X_{.3}$	$X_{..}$

Note: X_{ij} = total number of persons in category i and category j
X^{ij} = total number of persons in category j
$X^{\cdot j}$ = total number of persons in category i
$X^{i\cdot}_{\cdot\cdot}$ = total number of people who may require vocational education

TABLE 2

PROPORTION OF CATEGORY REQUIRING VOCATIONAL EDUCATION

i \ j	(1) Regular	(2) Disadvantaged	(3) Handicapped	Total
(1) Elementary students	a_{11}	a_{12}	a_{13}	
(2) High school students	a_{21}	a_{22}	a_{23}	
(3) High school graduates or dropouts and not employed	a_{31}	a_{32}	a_{33}	
(4) Employed	a_{41}	a_{42}	a_{43}	
Total				

Note: a_{ij} = proportion of persons in category i and category j of the population who should be receiving vocational education .

TABLE 3

POPULATION REQUIRING VOCATIONAL EDUCATION

i \ j	(1) Regular	(2) Disadvantaged	(3) Handicapped	Total
(1) Elementary students	$X_{11}a_{11}$	$X_{12}a_{12}$	$X_{13}a_{13}$	$N_{1.}$
(2) High school students	$X_{21}a_{21}$	$X_{22}a_{22}$	$X_{23}a_{23}$	$N_{2.}$
(3) High school graduates or drop-outs and not fully employed	$X_{31}a_{31}$	$X_{32}a_{32}$	$X_{33}a_{33}$	$N_{3.}$
(4) Fully employed	$X_{41}a_{41}$	$X_{42}a_{42}$	$X_{43}a_{43}$	$N_{4.}$
Total	$N_{.1}$	$N_{.2}$	$N_{.3}$	$N_{..}$

Note: $X_{ij}a_{ij}$ = number requiring vocational education in category i and category j.

$N_{i.}$ = total number of people requiring vocational education in category i (row).

$N_{.j}$ = total number of people requiring vocational education in category j (column).

$N_{..}$ = grand total number of people requiring vocational education

LEVEL II: Population Demanding Vocational Education

Population demanding vocational education refers to a "what is" situation as expressed by the person being classified. A person is defined as demanding vocational education if he is enrolled or wanted to enroll in a vocational education program.

Following the same logic as in defining the population requiring vocational education, the first step in defining the population demanding vocational education is to identify the number of persons fitting into each of the six previously defined categories. Data about the person's educational-employment status and special characteristics can be used to determine the category in which to place the individual.

The second step is to identify the proportion of people in each category who demand vocational education. The question to be asked is, "Are you enrolled or do you want to enroll in a vocational education program?" From answers to this question, the proportions can be derived. These proportions can be entered in a table similar to Table 2.

The numbers from step one and the proportions from step two are then combined, as in Table 3, to determine demand for vocational education.

LEVEL III: Population Demanding Public Sponsored Vocational Education

The keywords in the title of this level are "demanding" and "public sponsored". Again the person will be asked to express his demand by indicating where he is enrolled or wants to be enrolled. From this information, the proportion of persons demanding public sponsored vocational education can be derived. These proportions are then applied to the population demanding vocational education to determine the population demanding public sponsored vocational education.

Public sponsored vocational education is that vocational education which is given in a school or class under public supervision and control or under contract with the appropriate State Board for Vocational Education or a local educational agency.

LEVEL IV: Needs of the Population Demanding Vocational Education

With the population demanding vocational education defined, the next step is assessing the vocational needs of this population. The Vocational Amendments of 1968 (7) specifically indicate that the purpose of Title 1 (Vocational Education Federal Grants to states) is to assist them in providing vocational education "so that persons of all ages in all communities of the State ... will have ready access to vocational training or retraining which is of high quality, which is realistic in the light of actual or anticipated opportunities for gainful employment, and which is suited to their needs, interests, and ability to benefit from such training".

This statement of purpose includes four criteria on which to plan and on which to evaluate if vocational education programs are meeting the needs of people. They are: (a) ready access by people of all ages and communities, (b) high quality, (c) realistic in terms of actual or anticipated occupational opportunities, and (d) suited to their needs, interests and ability. The criteria of "high quality" and "realistic in terms of actual or anticipated occupational opportunities" will not be treated in this report. The former involves evaluation of on-going programs; the latter necessitates occupational demand assessment.

The other two criteria, "ready access by people of all ages and all communities" and "suited to their needs, interests and abilities" are more relevant to defining the needs of people to be served. Again, operational definitions are in order:

A. Ready access: The vocational program is offered at a convenient location to all age groups after entry to elementary school until retirement from the labor market. Access also refers to convenience of time, cost of program, and admission requirements.

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[7] "Amendments to the Vocational Education Act of 1963", Public Law 90-576, 90th Congress, H.R. 18366, October 16, 1968, p. 1.

B. Needs and ability: Orientation/exploration, initial job training, gain basic vocational study skills, promotion, improvement at present job, and retraining for different types of occupations constitute a variety of occupational needs or ability levels with respect to preparation for participation in the labor force. These needs or abilities should be validated by information about the age, sex, employment status, and special characteristics of the individual. The categories of disadvantaged and handicapped define special groups in terms of needs and ability.

C. Interests: The type of program in which persons are enrolled or want to enroll expresses interest. The specificity in type of program (i.e. general vocational, agriculture, farm mechanics) can vary with age or relation to labor force.

These operational definitions specify needs of persons demanding vocational education programs. Each person can be thought of as having a particular need or ability and interest. Each individual is also a particular age and is located in a particular part of the State. Information relating to each of these characteristics will provide a breakdown of the population demanding vocational education by need or ability, interest, age and location.

DATA COLLECTION

Population Requiring Vocational Education

Estimates used to complete Table 1 and Table 2 should be based on existing information where possible. It is recognized that the lack of comprehensive information may necessitate that some of the estimates be largely theoretical in nature. However, whether they are theoretical or empirical, the rationale for their derivation should be very specifically documented. No attempt was made in this study to estimate the population requiring vocational education.

Population Demanding Vocational Education

The following list defines the categories and specificity of data which needs to be collected in order to quantify demand using the operational definitions which have been proposed. The information could be collected on past, present, or future status. It seems most logical to collect descriptive information in terms of the present status. Information on demand for vocational education could, however, refer to what is expected in the future or what has actually happened in the past. Information about the past may be more reliable and easier for individuals to provide. Projections to the future could then be made following the trends of what had happened in the past. Asking information about the future allows the individual to consider alternatives which may not have been available in the past.

Information Collected on "Present Status"

1. Location: Economic region, county, farm and non-farm

2. Age: At last birthday

3. Sex: Male or female

4. Employment status: Hours of work per week
   - 4.1 None
   - 4.2 Less than 10 hours/week
   - 4.3 10-20
   - 4.4 21-30
   - 4.5 31-40
   - 4.6 More than 40

5. Reason for working less than 40 hours/week or not having a wage paying job
   - 5.1 Education or training: Enrolled in
     - 5.11 Elementary
     - 5.12 High school
     - 5.13 Post secondary vocational
     - 5.14 Junior college
     - 5.15 College or university
     - 5.16 Industry sponsored on-the-job training program
     - 5.17 Apprenticeship training
     - 5.18 Other
   - 5.2 Military
   - 5.3 Illness
   - 5.4 Institutionalized
   - 5.5 Do not wish to work more time
     - 5.51 Housewife
     - 5.52 Other
   - 5.6 Retired
   - 5.7 Could not find more work
   - 5.8 Other

6. Occupation Title (by aggregate from Census or Dictionary of Occupational Titles for occupation at which most time was spent if more than one job was held)

7. Special Characteristics
   - 7.1 Handicapped
     - 7.11 Mentally retarded
       - 7.111 Educable mentally handicapped
       - 7.112 Trainable retarded
     - 7.12 Hard of hearing and deaf
       - 7.121 Hard of hearing
       - 7.122 Deaf
     - 7.13 Speech impaired
     - 7.14 Visually handicapped
     - 7.15 Serious emotionally disturbed
     - 7.16 Physically impaired
   - 7.2 Disadvantaged
     - 7.21 Educationally
       - 7.211 Dropped out of school before completing grade 12
       - 7.212 Two or more grade levels behind in reading, mathematics or general achievement
     - 7.22 Economically
       - 7.221 Family size
       - 7.222 Family income
     - 7.23 Multiple characteristics

Information Collected on "During the Past Year", "At Present Time", or "In the Next Year"

1. Enrolled in vocational education
   - 1.1 Where
     - 1.11 Public Institution
       - 1.111 Elementary school
       - 1.112 Secondary school
       - 1.113 Post secondary school
       - 1.114 Other
     - 1.12 Private Institution
     - 1.13 Industry sponsored on-the-job training
     - 1.14 Apprenticeship
     - 1.15 Other
   - 1.2 Time
     - 1.21 Day, full-time
     - 1.22 Day, part-time
     - 1.23 Evening
   - 1.3 Reason for enrolling
     - 1.31 Orientation/Exploration
     - 1.32 Gain basic vocational study skills
     - 1.33 Initial job training
     - 1.34 Promotion
     - 1.35 Improve at present position
     - 1.36 Retrain for different type occupation
     - 1.37 Other
   - 1.4 Type of program
     - 1.41 General
       - 1.411 Agriculture
         - 1.4111 Farm mechanics

       (Specificity depending on vocational development)
       (Use Office of Education Instructional Program Titles)

2. Wanted to enroll past year but didn't
   - 2.1 Where
     - 2.11 Public Institution
       - 2.111 Elementary school
       - 2.112 High school
       - 2.113 Post secondary school
       - 2.114 Other
     - 2.12 Private Institution
     - 2.13 Industry sponsored on-the-job training
     - 2.14 Apprenticeship
     - 2.15 Undecided or don't know
     - 2.16 Other
   - 2.2 Time
     - 2.21 Day, full-time
     - 2.22 Day, part-time
     - 2.23 Evening

2.3 Reason for wanting to enroll
- 2.31 Orientation/Exploration
- 2.32 Gain basic vocational study skills
- 2.33 Initial job training
- 2.34 Promotion
- 2.35 Improve at present position
- 2.36 Retrain for different type occupation
- 2.37 Other

2.4 Type of program
- 2.41 General
  - 2.411 Agriculture
    - 2.4111 Farm mechanics
  - (Same as for enrolled)

2.5 Reason for not enrolling
- 2.51 Program not available in local area
- 2.52 Program not available at convenient time
- 2.53 Could not meet admission requirements
- 2.54 Costs of attending were too high
- 2.55 Present job did not allow time
- 2.56 Family obligation did not allow time
- 2.57 More training would not have financial benefit
- 2.58 Other

3. Not enrolled nor desired to enroll

DATA UTILIZATION

Types of Reports

From the data that has been described, the following reports could be produced:

1. Population demanding vocational education
2. Population demanding public sponsored vocational education
3. Needs of population demanding vocational education
   - 3.1 Age and location
   - 3.2 Needs and abilities
   - 3.3 Interests

Each of these populations could be further subdivided into the categories of elementary students, high school students, high school dropouts or graduates not fully employed, persons fully employed, disadvantaged and handicapped. A special report of those wanting to enroll but not enrolled in vocational education programs by reason for not enrolling could also be made.

The purpose of generating proportions as shown in Table 2 is to increase the useful life of the data. Once these proportions are established, they could presumably be used until there was an indicated need for their revisions. For example, if the proportion of handicapped persons in the elementary school population is once established, this proportion could be applied to the

elementary school population for the next year. In this way, data on the number of handicapped persons in elementary school would not have to be collected each year.

Using Data in Program Planning

First, the reports described in the previous section could be used to describe present size and kind of individual demand. Priorities could be placed on various categories of the population demanding vocational education in terms of who should be served first and to what extent.

Second, alternative situations could be generated by adding or subtracting various subcategories of persons from demand. For instance, the population demanding vocational education could be redefined to mean only those enrolled in vocational programs. The implications of this change could then be investigated in terms of its effects on size and costs of the State's program of vocational education.

Third, a comparison between the populations requiring and demanding vocational education has implications for both planning and evaluation. Vocational education planners could use this information to justify the need for program changes and/or additional resources.

A Useful Extension of Individual Demand Determination

Occupation to occupation mobility, geographic mobility, and school to occupation mobility comprise additional items for a complete data base for vocational education planning. Occupation to occupation mobility must be estimated if planners are to know what part of manpower demands are actually filled by people who are already employed (i.e. are not new entrants to labor force). Geographic mobility is an important consideration when planning for a specific geographic area. Information on the number of people and their occupational status who enter and leave the area can influence manpower demands. School to occupation and school to school mobility indicates the volumn of graduates produced and the kinds of occupations entered by graduates of various schools (i.e. high school, public post-secondary vocational, private post-secondary, MDTA, college). This information provides planners of vocational education with a perspective of their contribution to supplying potential employees. School to school mobility would describe the degree of movement from one level of school to another (i.e. high school to post-high school). This information would show the relationship and articulation between schools of different levels as well as different types (i.e. private vs. public).

The data to be collected to estimate individual demand for vocational education can also be extended to provide the above defined items of information. The extension is relatively simple. Instead of gathering one point in time description of an individual's status, the individual is asked to describe his status at two different points in time and explain what has happened between the two times. For example, an individual is asked his occupational title "at present" and "at this time last year". Summary of these answers for the population in a given area provides an estimate of occupation to occupation mobility.

The only alteration in data to be collected from that defined in the previous section titled "DATA COLLECTION" is that the first group of categories of information labeled "Information to be Collected on Present Status" would be collected on "Present Status" and "At This Time Last Year". The second group of categories of information would be collected on "During the Past Year".

Using this extension of data collection, additional reports on occupational, geographic, school to occupation and school to school mobility could be formulated. The information collected by this extension would be useful to vocational education planners in relating individual demands to manpower demands. In explaining this relationship, it will be assumed there exists an accurate description of manpower demands for persons trained for occupations requiring vocational education.

Manpower demands, as assumed in the previous paragraph, provide only a partial indicator on which to gauge the supply of trained people supplied by public sponsored vocational education. These demands must first be adjusted by: (a) the supply of trained people produced in the internal labor market without attendance in a vocational education program (i.e. promotions) and (b) the supply of trained people produced by non-public vocational education sources (i.e. private vocational schools, industry sponsored on-the-job training programs). The number of trained people supplied by the internal labor market can be derived from the collected data by calculating the number of people who change occupations for which vocational training is required between last year and this year and were not enrolled in a vocational training program. The calculation should be made using the occupation to which the change was made. The number of people fitting this criteria, by occupation, should be subtracted from manpower demands. Calculations should also be made using the occupation from which the change was made; the number of people combined in this latter calculation represent vacancies created by internal labor market mobility and, therefore, should be added to manpower demand.

The number of trained people produced by non-public vocational sources can be derived by calculating the number of people who changed occupations in the past year and were enrolled in a vocational education program but not a public sponsored program. These sums, by occupations, should be subtracted from manpower demand. They are assumed constant for short range program planning purposes, even though this number will vary depending upon the availability of public sponsored programs.

After the preceding adjustments have been made, the resultant manpower demand figure, by occupation, can be referred to as adjusted manpower demands. The adjusted manpower demands now provide a more accurate framework for planning the supply of vocational trained persons to be provided by public sponsored vocational training sources. Adjusted manpower demands will be filled or attempted to be filled (depending on the relative size of demand and supply) by persons enrolled or wanting to enroll in public vocational education programs for the reasons of initial job proficiency training, promotion, or retraining for different occupation. Using the information on location, the planner can decide where the programs should be offered. The information on age and

occupational status provides indicators of the level (i.e. high school, post-high school, adult) at which the program must be offered. The information on special characteristics (i.e. handicapped, disadvantaged) indicates the methods which might be most effective in the program to be offered.

The problem yet unsolved is the type of program to be offered (i.e. farm mechanics vs. secretarial). Here the planner has three options based on existing data. First, he can offer programs based solely on manpower demand. Second, he can offer programs based solely on the interests of people to be served. Third, he can offer programs based on manpower demand but use interests of people served as an input in a counseling sense (i.e. optimize the matching of manpower demand and interests of people). The third alternative seems most commensurate with the objectives of vocational education in its dilemma of meeting both social and manpower demands.

Information on people enrolled or wanting to enroll in public vocational education institutions for the reasons of "orientation/exploration" and "improve at present occupations", although never appearing in a manpower demand table, must also be considered in planning for vocational education from an individual demand perspective. A breakdown of this information by age, location and interests seems most appropriate for planning.

CRITERIA FOR DESIGN OF DATA COLLECTION

A design for collecting data relevant to the population requiring vocational education will not be treated in this paper. It has already been pointed out that, at this level, existing information should probably be used. How this information is integrated to determine the population requiring vocational education should be treated by those attempting that determination.

The rest of this section deals with the design of data collection on persons demanding vocational education. Since collection of this data entails an actual survey for new information, cost/effectiveness considerations become important. The question to be asked is, "What is the priority of importance and collection cost associated with each piece of information?" Using this question as a starting point, several criteria to be used in selecting a data collection design are advanced.

First, a pilot study of the data collection instruments would allow the opportunity to add, change, or delete questions or methods of collection which did not prove to be appropriate before going to a larger population.

Second, collection costs must be minimum. Several methods of data collection should be evaluated as to cost and effectiveness during the pilot test.

Third, it seems that sampling is an appropriate procedure to use as a means of reducing collection costs. Census data would provide a good base from which to determine sample size and provide for generalization back to the total population.

Fourth, a rural and urban area should be chosen for the pilot test in which a complete data collection and analysis is attempted. Different methods of collection may be found to be more effective for each area.

Fifth, priorities could be established for the categories of the population which have been defined (i.e. elementary, high school, disadvantaged). Data collection might then be conducted for the category or categories with highest priority. In this way, costs could again be reduced.

Sixth, since data will have to be updated periodically, a design of collection should be established which will provide valid and reliable sources at each collection.

SUMMARY

The objective of this section of the paper was to present a structure for assessing "people needs" for vocational education. The assessment structure defined "people needs" or "individual demand" in terms of the population requiring and the population demanding vocational education. Within the population demanding vocational education, the structure provides for further information about the demand for public sponsored vocational education and the specific needs of this population. A list of information required to quantify the structure for the population demanding vocational education is provided.

In theory, the structure will provide a framework within which to tackle, in a comprehensive manner, the problem of assessing "people needs" for vocational education. A valid means of ascertaining the effectiveness and efficiency of the structure in practice is to try it out in the real world. Such a try-out is explained in the following sections of this report.

Chapter II
DETERMINATION OF INDIVIDUAL DEMAND: A DESIGN FOR SELECTING A METHOD

INTRODUCTION

As stated in the previous chapter, information on individual demand for vocational education requires an actual survey for new information. Since resources are always limited, it becomes important to minimize the cost of collecting the necessary information. One means of reducing costs and improving effectiveness in the long run is to conduct a pilot test of several data collection methods. Costs can be reduced and effectiveness increased by selecting a data collection method based on actual performance during a pilot test.

With these factors in mind, a pilot test of several data collection methods was conducted. The objectives of the pilot test were to:

A. Determine if valid and reliable information to ascertain demand for vocational education can be attained from a sample.

B. Develop and demonstrate a sampling procedure that is effective in drawing a random sample of people for the purpose of determining their demand for vocational education.

C. Determine the costs and effectiveness of various methods of collecting the data to estimate demand for vocational education.

This chapter will describe the design of the pilot test. The description is divided into sections on selection of the geographic area in which the pilot test was conducted, selection of the sample of individuals from the population in the geographic area, construction of the data collection instrument used to gather the necessary information, and administration of the instrument. The next chapter will deal with data analysis and the results of the pilot test. The last chapter will define a set of guidelines for determining individual demand for vocational education based on the conclusions of the pilot test.

THE SAMPLE

Selection of Geographic Area

Based on the criteria set forth in Chapter I (see section on "Criteria for Design of Data Collection"), the area selected should have had both urban and rural residents. With the limited resources available to conduct the pilot test, the following selection rules were used to select the geographic area: (1) County as maximum size, (2) 30,000 as maximum population, (3) one city over 10,000 population (representing an urban area), (4) largest city located near center of county, and (5) area within reasonable distance from center conducting study (less than 100 miles).

The county was chosen as the maximum size for the geographic area because it would limit the amount of travel time and expense within the area and because it has specific boundaries. Also, other kinds of population and demographic data are compiled on a county basis so the results of the sample could be tested as to their representativeness of the population. The population maximum was set at 30,000 on the basis of resources and time available to conduct the pilot test.

One city over 10,000 population was required in order to get a city which would qualify as an urban setting. The remaining area outside the city of 10,000 was to be composed of smaller communities and rural area. These two selection rules were set to meet the criteria specified in Chapter 1 that the pilot test cover a rural and urban area.

The selection rule that the large city be located near the center of the county was specified for the convenience of sampling. As it turned out, the sampling procedure which was developed would have worked just as well without this selection rule enforced.

The rule that the geographic area be within reasonable distance from the center conducting the test was set to limit time and travel expense in administering the study.

Using these selection criteria, Steele County in Minnesota was selected as the geographic area in which the pilot test was conducted. Steele County has a population of 26,931 according to the 1970 Census. Owatonna, the largest city in the county, has a population of 15,341 and is located in the middle of the county. Other communities in the county over 500 in population are Blooming Prairie (1,804), Medford (690), and Ellendale (569). Steele County is located approximately 75 miles from the center conducting the pilot test. Maps relating the place of Steele County in the State and the location of the previously listed communities in Steele County are shown in Figures 1 and 2.

Selection of the Sampling Units and Sample Size

The sampling objective which appeared most logical was to select a random sample of individuals over 13 years of age from the population in the geographic area. The age limit of 13 years and older was used because this is the year at which students move into the ninth grade, at which time specific vocational education programs become available. Further, at ages younger than 13, it may be wiser for someone else (i.e. parent, teacher, school administrator) to decide what vocational education is needed.

The sampling unit selected to accomplish this task was a small area called a sampling segment (SS) which contained approximately six households. This sampling unit is similar to that used in Current Population Surveys by the Census Bureau.[1] Households were used because they represent identifiable places

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[1] "The Current Population Survey - A Report on Methodology", Bureau of Census, U.S. Department of Commerce, Technical Paper No. 7, U.S. Government Printing Office, Washington, D.C. 1963.

Figure 1
Location of Steele County in Minnesota (shaded area)

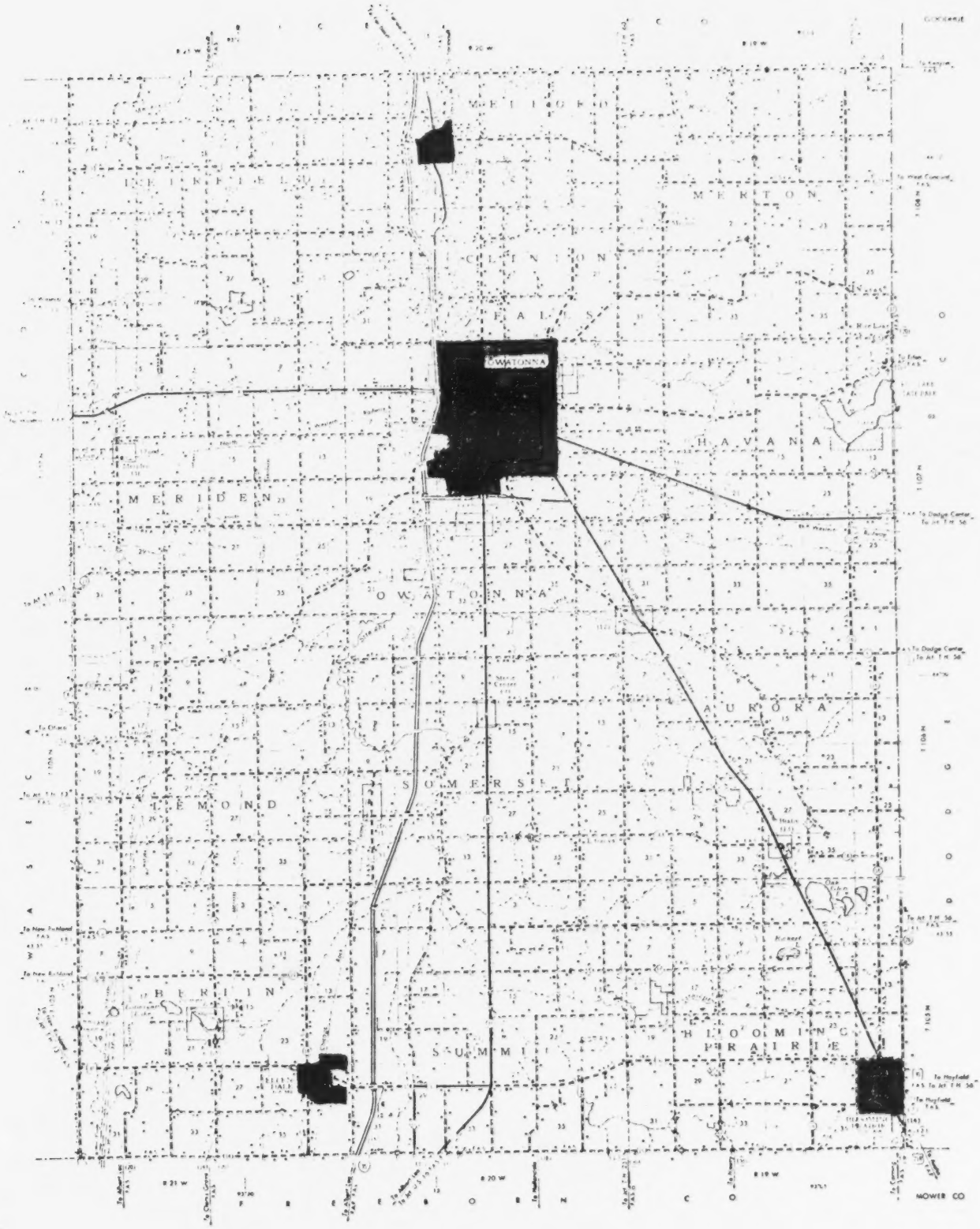

Figure 2
Steele County, the Selected Geographic Area in Which Pilot Test was Conducted

at which all people in the geographic area can be contacted . As in Current Population Surveys, six households per segment were used to reduce the cost of travel in interviewing and to get a representative sample of a small geographic area.

The sample size was based on expected return and the reason for which the data were to be used. The expected return was estimated on the basis of a pilot test involving 52 households--27 in rural areas and 25 in urban areas (explained in a later section). The rate of return was approximately 50 percent.

The purpose of this study was to test various methods of estimating individual demand for vocational education. These estimates could then be used in planning vocational education programs to meet individual demand. It had previously been concluded that a sample was necessary, rather than asking everyone in the population, for the sake of economy. The question was, "How large a sample was needed?" The answer to this question is based on the number of different vocational education programs expected to be of interest, the accuracy needed in the estimate, the resources available to conduct the study, and the expected rate of response from the people. It was assumed that there would be individual demand for approximately fifty different vocational education programs and that the amount of demand for each of the programs would be relatively uniform. Further, it was decided that the allowable error in an estimate of the number of persons interested in a particular vocational program should be that the estimate plus or minus 50 persons should include the actual population value in ninety samples out of one hundred. The decision on degree of accuracy needed was based on the author's perceptions of the accuracy a planner needs to estimate demand for a particular vocational education program and the amount of resources available to conduct this study. With this degree of accuracy, a sample of approximately two thousand individuals from a population of twenty thousand is required. Since the expected rate of response based on the trial test was fifty percent, the required sample size was doubled to be four thousand. A sample of four thousand from a population of twenty thousand is a 20 percent sample.

It was assumed that the population was randomly distributed throughout the households in the County. With this assumption, it was valid to randomly sample 20 percent of the households and expect a 20 percent random sample of the individuals in the population. The next part of this section will describe the procedure used to randomly sample 20 percent of the households in Steele County. The procedure assumes that households can randomly be distributed among sampling segments.

Selection of Sample

A modification of the procedure outlined by the United States Census Bureau[2] was used to randomly sample households in Steele County. This procedure required census data information concerning population and household

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[2] Ibid.

numbers. This information was available through the Minnesota Analysis and Planning System (MAPS)[3] on a county-wide basis.

Census data provides information for each enumeration district (ED). An ED can be defined as a distinct geographic area, such as a township, or as a geographic area containing a given number of people with a defined boundary. Figure 3 shows the 35 enumeration districts in Steele County. Note that 16 of those ED's are located within the city of Owatonna. It should also be noted that the Census Bureau bases its ED boundaries on a rural-urban criteria, so that these two categories are kept separate for data reporting purposes.

Using the census data from MAPS the sampling procedure required:

1. Listing the 35 ED's in Steele County in descending order by population size according to the 1970 census. Table 4 shows the information obtained from MAPS. The listing of ED's in descending order is shown in Table 5.

2. Listing of the number of dwellings or households in each ED (referred to on Table 4 as "1970 HSGN COUNT") alongside the population count.

3. Estimating the number of Sample Segments (SS's) in each ED. This was done by dividing the number of dwellings by six. Six was chosen by the Census Bureau as the desired sampling size for each SS. Table 6 illustrates this procedure. For example, ED 11 had a 1970 housing count of 484 (fourth column). When the 484 households were divided by six it was estimated that ED 11 had 81 SS's (fifth column). Contrast this to ED 31 (Ellendale Village) which ranked 26th in order, had a housing count of 211 and 35 SS's.

4. Determining the cumulative number of SS's in the ED's in Steele County. This was accomplished by adding the SS's consecutively for all ED's shown as in the sixth column of Table 6. This resulted in 1,451 total SS's.

5. Determining the number of sample segments to be selected from each enumeration district. After the cumulative measures of size were established, the sample was drawn for the study. The procedure used was designed to sample all ED's systematically and in such a manner that the sample selected would represent an accurate cross-section of the total population. This required that ED's with a high population and housing count have a larger number of SS's chosen for the survey than less densely populated ED's.

As mentioned earlier, the desired sample size for the survey was twenty percent of all households in Steele County. This meant that one out of every five households was to be included. To start the sampling of SS's, a number between "one" and "five" was randomly selected. This digit became the base number, and "5's" were added in succession until this series of numbers exceeded the total number of SS's (1451).

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[3]Minnesota Analysis and Planning Systems, University of Minnesota, St. Paul, Minnesota.

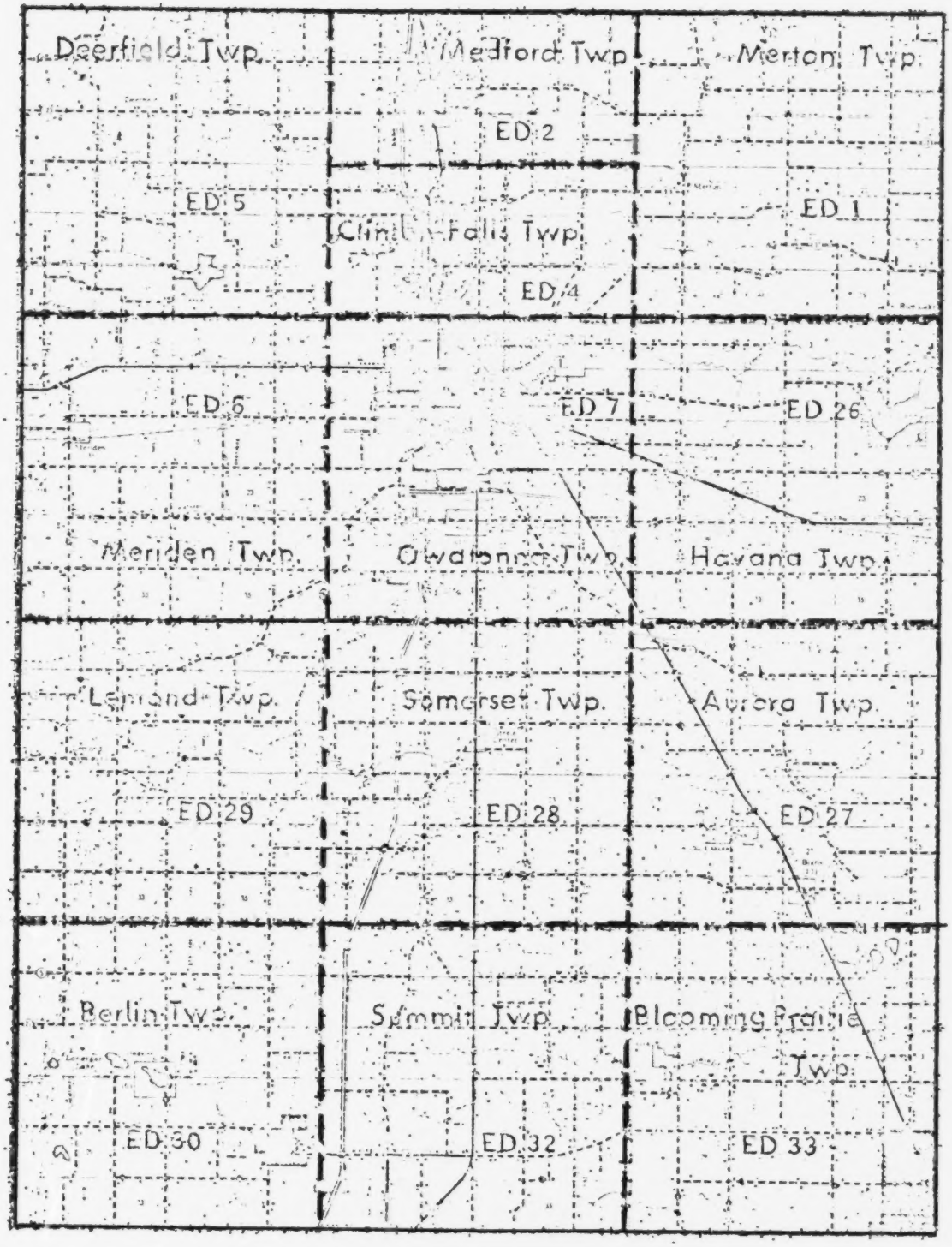

Figure 3
Enumeration Districts in Geographic Area to be Sampled

Table 4

POPULATION AND HOUSING COUNT FOR ENUMERATION DISTRICTS
IN SELECTED GEOGRAPHIC AREA

AREA NAME	ENUMRTN DIST.	1970 POP COUNT	1970 HSNG COUNT
MERTON TWP	0001	475	157
MEDFORD TWP	0002	423	123
MEDFORD	0003	690	225
CLINTON FALLS TWP	0004	483	137
DEERFIELD TWP	0005	624	174
MERIDEN TWP	0006	791	233
OWATONNA TWP	0007	1054	328
OWATONNA	0008	0	0
OWATONNA	0009	924	331
OWATONNA	0010	1328	365
OWATONNA	0011	1528	484
OWATONNA	0012	865	279
OWATONNA	0013	119	43
OWATONNA	0014	889	343
OWATONNA	0014.B	0	0
OWATONNA	0015	468	286
OWATONNA	0016	653	257
OWATONNA	0017	949	334
OWATONNA	0018	1108	306
OWATONNA	0019	1287	379
OWATONNA	0019.B	11	1
OWATONNA	0020	1381	391
OWATONNA	0021	977	338
OWATONNA	0022	1178	436
OWATONNA	0023	686	209
OWATONNA	0024	654	242
OWATONNA	0025	336	45
HAVANA TWP	0026	611	191
AURORA TWP	0027	726	232
SOMERSET TWP	0028	991	259
LEMOND TWP	0029	567	180
BERLIN TWP	0030	484	234
ELLENDALE	0031	569	211
SUMMIT TWP	0032	653	181
BLOOMING PRAIRIE TWP	0033	645	182
BLOOMING PRAIRIE	0034	1001	335
BLOOMING PRAIRIE	0035	803	307

Table 5

ENUMERATION DISTRICTS ARRANGED IN DESCENDING ORDER
BY POPULATION COUNT

ENUMRTN DIST.	1970 POP COUNT	AREA NAME
0011	1528	OWATONNA
0020	1381	OWATONNA
0010	1328	OWATONNA
0019	1287	OWATONNA
0022	1178	OWATONNA
0018	1108	OWATONNA
0007	1054	OWATONNA TWP
0034	1001	BLOOMING PRAIRIE
0028	991	SOMERSET TWP
0021	977	OWATONNA TWP
0017	949	OWATONNA
0009	924	OWATONNA
0014	889	OWATONNA
0012	865	OWATONNA
0035	803	BLOOMING PRAIRIE
0006	791	MERIDEN TWP
0027	726	AURORA TWP
0003	690	MEDFORD
0023	686	OWATONNA
0024	654	OWATONNA
0016	653	OWATONNA
0032	653	SUMMIT TWP
0033	645	BLOOMING PRAIRIE TWP
0005	624	DEERFIELD TWP
0026	611	HAVANA TWP
0031	569	ELLENDALE
0029	567	LEMOND TWP
0030	484	BERLIN TWP
0004	483	CLINTON FALLS TWP
0001	475	MERTON TWP
0015	468	OWATONNA
0002	423	MEDFORD TWP
0025	336	OWATONNA
0013	119	OWATONNA
0019.B	11	OWATONNA
0008	0	OWATONNA
0014.B	0	OWATONNA

Table 6

DERIVING THE NUMBER OF SAMPLE SEGMENTS TO BE SELECTED
FROM EACH ENUMERATION DISTRICT

Column 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8
AREA NAME	ENUMRTN DIST.	1970 POP COUNT	1970 HSNG COUNT	SS's	CUMUL. SS	RANDOM NO. (0-5)	NO. RANDOM NOS.
OWATONNA	0011	1528	484	81	0000-0081	2, 7, 12, 17, 22, 27, 32, 27, 42, 47, 52, 57, 62, 67, 72, 77	16
OWATONNA	0020	1381	391	65	0082-0146	82, 87, 92, 97, 102, 107, 112, 117, 122, 127, 132, 137, 142	13
OWATONNA	0010	1328	365	61	0147-0207	147, 152, 157, 162, 167, 172, 177, 182, 187, 192, 197, 202, 207	13
OWATONNA	0019	1287	379	63	0208-0270	212, 217, 222, 227, 232, 237, 242, 247, 252, 257, 262, 267	12
OWATONNA	0022	1178	436	73	0271-0343	272, 277, 282, 287, 292, 297, 302, 307, 312, 317, 322, 327, 332, 337, 342	15
OWATONNA	0018	1108	306	51	0344-0394	347, 352, 357, 362, 267, 372, 377, 382, 387, 392	10
OWATONNA TWP	0007	1054	328	55	0395-0449	397, 402, 407, 412, 417, 422, 427, 432, 437, 442, 447	11
BLOOMING PRAIRIE	0034	1001	335	57	0450-0506	452, 457, 462, 467, 472, 477, 482, 487, 492, 497, 502	11
SOMERSET TWP	0028	991	259	43	0507-0549	507, 512, 517, 522, 527, 532, 537 542, 547	9
OWATONNA	0021	977	338	56	0550-0605	552, 557, 562, 567, 572, 577, 582, 587, 592, 597, 602	11
OWATONNA	0017	949	334	56	0606-0661	607, 612, 617, 622, 627, 632, 637, 642, 647, 652, 657	11
OWATONNA	0009	924	331	55	0662-0716	662, 667, 672, 677, 682, 687, 692, 697, 702, 707, 712	11
OWATONNA	0014	889	343	57	0717-0773	717, 722, 727, 732, 737, 742, 747, 752, 757, 762, 767, 772	12
OWATONNA	0012	865	279	47	0774-0820	777, 782, 787, 792, 797, 802, 807, 812, 817	9
BLOOMING PRAIRIE	0035	803	307	51	0821-0871	822, 827, 832, 837, 842, 847, 852, 857, 862, 867	10

TABLE 6 (cont.)

AREA NAME	ENUMRTN DIST.	1970 POP COUNT	1970 HSNG COUNT	SS's	CUMUL. SS	RANDOM NO. (0-5)	NO. RANDOM NOS.
MERIDEN TWP	0006	791	233	39	0872-0910	872, 877, 882, 887, 892, 897, 902, 907	8
AURORA TWP	0027	726	232	39	0911-0949	912, 917, 922, 927, 932, 937, 942, 947,	8
MEDFORD	0003	690	225	38	0950-0987	952, 957, 962, 967, 972, 977, 982, 987	8
OWATONNA	0023	686	209	35	0988-1022	992, 997, 1002, 1007, 1012, 1017, 1022	7
OWATONNA	0024	654	242	40	1033-1062	1027, 1032, 1037, 1042, 1047, 1052, 1057, 1062	8
OWATONNA	0016	653	257	43	1063-1105	1067, 1072, 1077, 1082, 1087, 1092, 1097, 1102	8
SUMMIT TWP	0032	653	181	30	1106-1135	1107, 1112, 1117, 1122, 1127, 1132	6
BLOOMING PRAIRIE TWP	0033	645	182	30	1136-1165	1137, 1142, 1147, 1152, 1157, 1162	6
DEERFIELD TWP	0005	624	174	29	1166-1194	1167, 1172, 1177, 1182, 1187, 1192	6
HAVANA TWP	0026	611	191	32	1195-1226	1197, 1202, 1207, 1212, 1217, 1222	6
ELLENDALE	0031	569	211	35	1227-1261	1227, 1232, 1237, 1232, 1247, 1252, 1257	7
LEMOND TWP	0029	567	180	30	1262-1291	1262, 1267, 1272, 1277, 1282, 1287	6
BERLIN TWP	0030	484	154	26	1292-1318	1292, 1297, 1302, 1307, 1312, 1317	6
CLINTON FALLS TWP	0004	483	137	23	1319-1341	1322, 1327, 1332, 1337	4
MERTON TWP	0001	475	157	26	1342-1367	1342, 1347, 1352, 1357, 1362, 1367	6
OWATONNA	0015	468	286	48	1368-1415	1372, 1377, 1382, 1387, 1392, 1397, 1402, 1407, 1412	9
MEDFORD TWP	0002	423	123	21	1416-1436	1417, 1422, 1427, 1432	4
OWATONNA	0025	336	45	8	1437-1444	1437, 1442	2
OWATONNA	0013	119	43	7	1445-1451	1447, 1452	1
OWATONNA	0019.B	11	1	12			
OWATONNA	0008	0	0	-	-	-	-
OWATONNA	0014.B	0	0	-	-	-	-

In Table 6, the results of this process are illustrated in the seventh column. In the actual sampling, the digit "2" was randomly selected. The digit "5" was added to each succeeding number (2, 7, 12 ... 1247, 1452) until the cumulative measures of size (1,451 SS's) was exceeded. The number of SS's to be drawn from each ED was equal to the number of random numbers falling in the range of cumulative SS's within the given ED. For example, the ED 30 (Berlin Township) has 26 SS's and these 26 occurred as numbers 1292-1318 in the cumulative SS column of Table 6. The random numbers falling within this range were 1292, 1297, 1302, 1307, 1312, and 1317. Therefore six (the number of random numbers within the range) sample segments were sampled for the survey from ED 30. This procedure provided a count of the exact number of SS's to be drawn from each ED, with ED's being sampled proportionate to population size. The number of SS's drawn from each ED is shown in the eighth column of Table 6.

6. Locating households within enumeration districts. Each SS was composed of approximately six household units. These households might be a residence, an apartment, a mobile home or other places of residence. All the dwelling units in each ED were geographically located so that the ED could accurately be divided into SS's.

Several methods were used to locate dwelling units. The City of Owatonna has what is known as a "City Directory". This hard covered publication provides street addresses, telephone numbers and a reverse telephone directory. Every dwelling and business is listed by street address. This allowed one to determine the number of dwellings along each side of every street by blocks. By using a large city map, all SS's in Owatonna, the largest city in the County, were identified.

Smaller towns did not have the advantage of a directory such as the one mentioned above. In the small communities it was necessary to take a city map, drive around town, and plot the number of dwellings in each block, or use aerial photographs to locate dwellings. The cooperation of a knowledgeable person to identify multiple dwelling units was invaluable.

Rural areas were divided in a manner similar to that used in Owatonna. Utility company maps and plot books denoted the location of rural dwellings. Figure 7 illustrates a sample ED with all households identified.

7. Grouping households into sample segments. After the households had been located, they were grouped together with approximately six households per group. In making the groupings, natural boundaries such as streets, roads, rivers, etc. were used as much as possible. The reason for use of natural boundaries was that for interviews it would be easier to identify the households in a particular sample segment (i.e. all those on west side of Elm Street between 4th and 5th Avenues). Each SS was then assigned a number. The SS's were numbered beginning with "one" and proceeding until all groups had their own number. Figure 8 illustrates how the sample ED was divided into SS's of approximately six households, each based on geographic location and then numbered. In this example, there were 26 SS's in the ED.

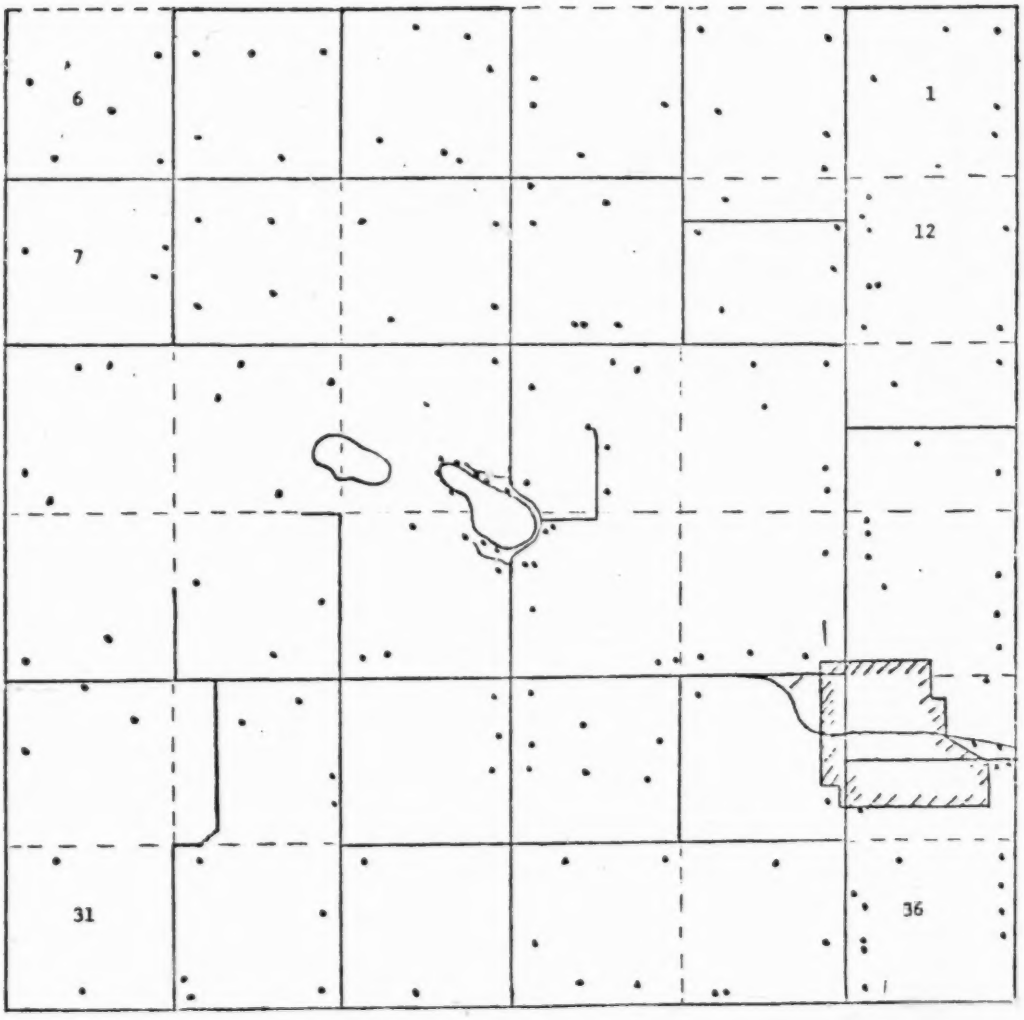

Figure 7
Locating Households in an Enumeration District

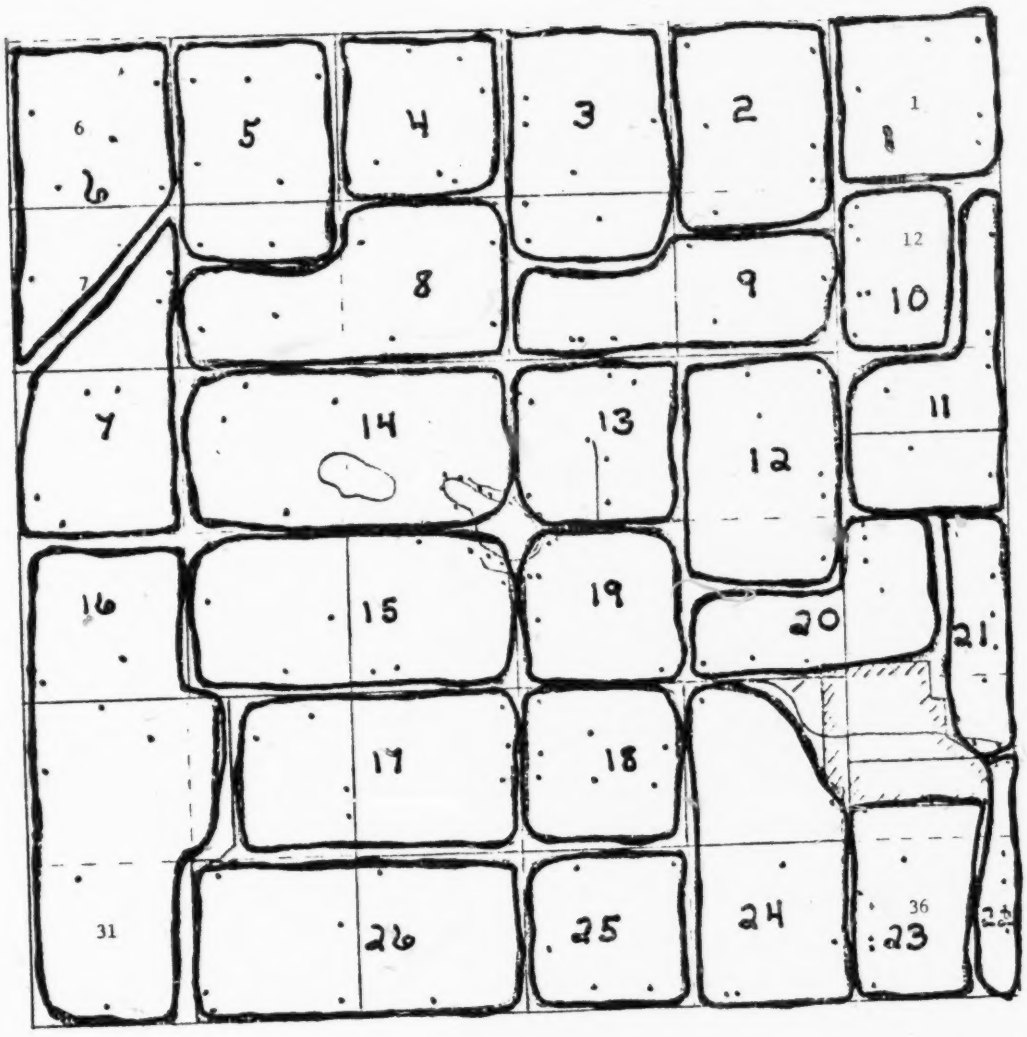

Figure 8
Grouping Households into Sample Segments

8. Selecting sample segments to be included in the survey. Sample segments in an enumeration district were to be randomly selected. This was accomplished by using a random number table such as commonly available in statistical references. The exact number of SS's that were to be chosen from each ED was determined as explained previously (see Table 6).

Random numbers occurring between "1" and the number of SS's in ED (derived in Step 7 above) were selected until as many numbers were chosen as there were SS's designated for that ED. In the example ED there were 26 SS's and 6 were to be selected (Table 8, eighth column).

9. Identifying names and addresses of households in selected sample segments. This information was derived from the Owatonna City Directory and the Steele County Directory for residents of Owatonna and rural Steele County. The names of residents in the selected areas of Blooming Prairie, Ellendale, Medford and the smaller communities was obtained from knowledgeable persons in those communities. Once the process of obtaining names and addresses of residents was completed, the sample was identified.

THE DATA COLLECTION INSTRUMENT

In order to collect the information to identify demand for vocational education and some descriptive information about the people who were making the demands, it was necessary to construct a data collection instrument. The questionnaire developed was based on the information needed as specified in Chapter I (see section on "DATA COLLECTION").

Description of Questionnaire

There were five sections to the questionnaire, which were as follows:

I. Questions about your household

II. Questions about your employment in October, 1970

III. Questions about your employment in October, 1971

IV. Questions about your need for vocational education

V. Questions about a course or courses in vocational education in which you were enrolled

VI. Questions about a course in vocational education in which you wished to enroll but didn't

The questionnaire was designed to gather information about the past year because it was assumed that respondents would give more valid and reliable answers about what had been rather than what would be. Projections could then be made to future years. In addition to information needed to determine individual

demand for vocational education, it was decided to collect additional data as described in Chapter I in the section headed "A Useful Extension of Individual Demand Information". The additional information was then used to check the workability and usefulness of the proposed extension.

Section I on "Questions About Your Household" was designed to gather descriptive information about the population. This section is shown in Exhibit I.

Exhibit 1

I. QUESTIONS ABOUT YOUR HOUSEHOLD:

As of **October, 1971** As of **October, 1970**

1. Address _____ City and State _____ City and State

[12-21] [ ][ ][ ][ ][ ] [ ][ ][ ][ ][ ]

Answer the following questions as of OCTOBER, **1970**.

2. What was the approximate combined total income of all members of this household this past year (check one):

[22] (1) ____ under $3000 (2) ____ $3000 to 4,999 (3) ____ $5,000 to 7,999 (4) ____ $8,000 or more

[23-24] 3. How many people of all ages (including yourself) lived in this household: ____

[25-26] 4. Your age ____ 5. Sex: (1) ____ Male (2) ____ Female

[27]

[28] 6. Marital status (check one): (1) ____ Single (2) ____ Married (3) ____ Other

7. How many grades of school had you completed (check one)

[29] (1) ____ less than 6 (3) ____ 8 (5) ____ 10 (7) ____ 12 (9) ____ 14 or more
(2) ____ 7 (4) ____ 9 (6) ____ 11 (8) ____ 13

8. Check any one of the following if it described your physical condition:

[30] ____ Deaf

[31] ____ Hard of hearing (need hearing aid)

[32] ____ Speech problem (stutter, etc.)

[33] ____ Blind (20/200 or less in better eye after correction)

[34] ____ Partially sighted (20/200 to 20/70 in better eye after correction)

[35] ____ Physically impaired (crippled, heart condition, etc.)

The question about address in October, 1970 and 1971 gathered information about geographic mobility. Questions 2 and 3, in combination, were indicators of economic disadvantagement. Questions 4, 5, and 6 were necessary to check the representativeness of the sample and to generalize the sample information to the population. Question 7, about grades of school completed, was used in combination with age as an indicator of educational disadvantagement. Question 8 gathered information on number and type of handicaps. The numbers in brackets along the left and right sides were used as directions for keypunching so that the form could be directly keypunched without transferring to coding sheets. This format resulted in considerable savings of time in processing the questionnaires.

Sections II and III concerning "Questions About Your Employment in October, 1970" and "Questions About Your Employment in October, 1971" are shown as Exhibit 2 and 3, respectively.

Exhibit 2

II. QUESTIONS ABOUT YOUR EMPLOYMENT IN OCTOBER, 1970:

The next section deals with your employment situation as of **October, 1970** (one year from this past October). Please answer Questions 9 through 16 in terms of your employment at that time.

9. On the average, how many hours did you work per week (including all jobs) during October of *1970*? (Work is defined as an activity for which you are paid money, or receive some other kind of pay) Check one:

[36] (1) ___ None—not working (3) ___ 20-35 hours/week

(2) ___ Less than 20 hours/week (4) ___ More than 35 hours/week

If you checked (4) in Question 9, skip to Question 11. If you checked (1), (2), or (3) in Question 9, go to Question 10.

10. Please indicate *WHY* you worked 35 or fewer hours/week or did not have a wage paying job. (Check those that apply):

[37] ___ In school (if you check this one, then indicate): ⇨ ___ Grade 8 or below [47]

[38] ___ In military service ___ Grade 9-12 [48]

[39] ___ Ill ___ Post secondary vocational [49]

[40] ___ Confined to an institution ___ Junior college [50]

[41] ___ Retired ___ College or university [51]

[42] ___ Could not find work ___ On-the-job training program with an industry [52]

[43] ___ Did not want more wage paying work (If you check this one, WHY?) ___ Apprenticeship training [53]

[44] ___ Homemaker ___ Other (describe) ___ [54]

[45] ___ Other (describe) ___

[46] ___ Other reason (describe) ___

If you checked (1) in Question 9, skip to Question 16. If you checked (2), (3), or (4), answer Questions 11-15.

11. How many employers did you have? ___ [55]

12. Who was your main (or only) employer in **October, 1970?** (Give name of company, business, or organization).

___

___

13. In what city and state was your main (or only) employer located? ☐☐ ☐☐ [56-60]

City: ___ State: ___

14. What kind of business or industry was this? (For example: furniture manufacturer, retail grocery store, banking, soil conservation service, farming).

_____ [61-64]

_____

15. What kind of work were you doing at this business or industry during October of 1970? (For example: manager, typist, farmer)

_____

_____ [65-69]

Exhibit 3

III. QUESTIONS ABOUT YOUR EMPLOYMENT IN OCTOBER, 1971:

Questions 16 through 24 should be answered as they apply to your employment situation during **OCTOBER, 1971** (this past October).

16. On the average, how many hours did you work per week during **October, 1971?** Check one:

[70]

(1)_____ None —not working

(2)_____ Less than 20 hours/week

(3)_____ 21-35 hours/week

(4)_____ More than 35 hours/week

[1-2] [3-11] 17. If you checked (4) in Question 16, skip to Question 18. If you checked (1), (2), or (3) in Question 16, please indicate WHY you worked 35 or fewer hours/week or did not have a wage paying job. (Check those that apply):

[12] _____ In school (if you check this one, then indicate): ⇨ _____ Grade 8 or below [22]

[13] _____ In military service _____ Grade 9-12 [23]

[14] _____ Ill _____ Post secondary vocational [24]

[15] _____ Confined to an institution _____ Junior college [25]

[16] _____ Retired _____ College or university [26]

[17] _____ Could not find more work _____ On-the-job training program with an industry [27]

[18] _____ Did not want more wage paying work (If you check this one, WHY?) _____ Apprenticeship training [28]

[19] _____ Homemaker _____ Other (describe)_____ [29]

[20] _____ Other (describe)_____

[21] _____ Other reason (describe)_____

If you checked (1) in Question 16, skip to Question 23. If you checked (2), (3), or (4) in Question 16, answer Questions 18-22.

18. How many employers did you have?_____ [30]

19. Who was your main (or only) employer in October, *1971*? (Give name of company, business, organization):

_____

20. In what city and state was your main (or only) employer located? [31-35]

City:_____ State:_____

21. What kind of business or industry is this? (For example: furniture manufacturer, retail grocery store, soil conservation service, farming):

_____ ☐☐☐☐ [39-42]

22. What kind of work were you doing at this business or industry during October, 1971? (For example: machinist, manager, typist, farmer):

_____ ☐☐☐☐ [43-46]

They are identical in format except for the differences in dates. These two sections allowed the respondent to describe how he spent most of his time at two different dates. In combination the sections provided information on school to school mobility, school to job mobility, and job to job mobility.

The explanation of these sections will refer only to Exhibit 3. Question 16 was used to find whether or not the respondent was working and, if working, to what extent. If the respondent worked more than 35 hours per week, he or she was considered to be fully employed. Those who indicated that they worked 35 or fewer hours per week in Question 16 were asked in Question 17 to indicate why they were not fully employed. The choices were in school, in military service, ill, confined to an institution, retired, could not find work, did not want more wage paying work, and other reasons. If the respondent checked that he was in school, he was asked to indicate what type.

Questions 18 through 22 were designed to collect information which would describe the respondent's occupation if he was working. Question 18 asked how many employers he or she had. Questions 19 through 21 provided information describing the respondents main or only employer in terms of name of business or industry, location of employers, and type of industry. Location of employer could be used in connection with Question 1 in the previous section to assess how far the respondent traveled to work. Question 22 asked the respondent to describe his occupation with his main or only employer. The industry and occupation in which the respondent was employed were coded into the categories identified and defined by the U.S. Census Bureau[4].

Section IV asked "Questions About Your Need for Vocational Education". In this Section, vocational education was defined as "A training course or educational program that would prepare you for a new job or better prepare you for the job you now have. Vocational education programs are found in public schools, private schools, and industry. Vocational education does not include preparation for jobs requiring college degrees or training for leisure or hobby activities". Again the questions were asked about the past for reasons of validity and reliability.

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[4]"Alphabetical Index of Industries and Occupations", Bureau of Census, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C., June, 1971.

Exhibit 4

IV. QUESTIONS ABOUT YOUR NEED FOR VOCATIONAL EDUCATION:

This section asks you to tell about your need for vocational education. VOCATIONAL EDUCATION means a training course or educational program that would prepare you for a new job or better prepares you for the job you now have. Vocational education programs are found in public schools, private schools, and industry. Vocational education does not include preparation for jobs requiring a college degree or training for leisure or hobby activities.

23. Between OCTOBER, **1970** and OCTOBER, **1971**, were you? (Check those that apply):

[ ] (1) ENROLLED in one or more vocational education courses
(If you check this one, answer Questions 24-30)

[ ] (2) WANTED TO ENROLL in a vocational education course, but didn't
(If you check this one, answer Questions 31-38)

[ ] (3) DID NOT WANT to enroll in any vocational education course
(If you check this one, you need not answer any more questions. Thank you.)

The choices as shown in Exhibit 4, Question 23 are enrolled, wanted to enroll but didn't, and did not want to enroll. These choices provided three levels of intensity of demand--those with a demand strong enough that they enrolled, those with interest but did not enroll for some reason, and those with no interest or demand. If the respondent checked one of the first two choices, he was asked to complete another section of the questionnaire. Those who indicated they did not want to enroll had completed the questionnaire at this point.

Section V is entitled "Questions About a Course or Courses in Vocational Education in Which You Were Enrolled". It is shown as Exhibit 5.

Exhibit 5

V. QUESTIONS ABOUT A COURSE OR COURSES IN VOCATIONAL EDUCATION IN WHICH YOU WERE ENROLLED:

Answer Questions 24-30 only if you WERE ENROLLED in a vocational education course between OCTOBER, *1970* AND OCTOBER, *1971*. If you were enrolled in more than two courses, answer the following questions for the two longest courses:

24. In what general *type* of vocational education course or courses were you enrolled? (Check one for each course in which you enrolled):

	Course 1	*Course 2*	
[48]	(1) ____	____	AGRICULTURAL—(For example: farm mechanics, farm business management, agricultural chemicals, feeds, horticulture)
[49]	(2) ____	____	DISTRIBUTIVE—(For example: advertising, finance and credit, merchandising, transportation)
	(3) ____	____	HEALTH—(For example: dental assistant, nursing, medical laboratory technician)
	(4) ____	____	HOME ECONOMICS—(For example: child care, clothing, family health, institutional cooking, consumer education)
	(5) ____	____	OFFICE—(For example: accounting, cashier, filing clerk, typist, secretary)
	(6) ____	____	TECHNICAL—(For example: communication technician, refrigeration specialist, chemical technician)
	(7) ____	____	TRADE AND INDUSTRIAL—(For example: carpentry, electrician, welder, machinist, cosmotologist, radio repairman)

25. What was the *specific title* of the course or courses in which you were enrolled? (For example: farm power and machinery, auto-body repair, legal secretary, institutional cooking):

Course 1: _____ [ ][ ][ ][ ][ ] [50-55]

Course 2: _____ [ ][ ][ ][ ][ ] [56-61]

26. Where were you enrolled for the course or courses you took in vocational education? (Check *one* for each course):

	Course 1	*Course 2*		*Course 1*	*Course 2*	
[62]	(1) ____	____	Public school (If you check this one, was it): ⇨	____	____	High school
[63]	(2) ____	____	Private school			
	(3) ____	____	On-the-job training with industry	____	____	Post secondary vocational school [64] [65]
	(4) ____	____	Apprenticeship program	____	____	Other (describe)
	(5) ____	____	Other (describe)			_____

27. How many hours per week were you enrolled in vocational education courses? (Check *one* for each course):

	Course 1	*Course 2*	
[66]	(1) ____	____	3 hours per week or less
[67]	(2) ____	____	4-19 hours per week
	(3) ____	____	20 hours per week or more

28. How many weeks were you enrolled in vocational education courses? (Check one for each course):

[1-2]
[3-11]

	Course 1	Course 2	
[12]	(1)		10 weeks or less
[13]	(2)		11-23 weeks
	(3)		24 weeks or more

29. What was your reason for enrolling in a vocational education course or courses? (Check the *ONE* most accurate reason for each course):

	Course 1	Course 2	
	(1)		To get an introduction to vocational education
	(2)		To obtain skills in arithmetic, reading, or writing
[14]	(3)		To get training for my first full-time job
	(4)		To improve my ability at my present job
[15]	(5)		To improve to get promoted
	(6)		To train for a new job, not related to present or past job
	(7)		Other (describe) _____

30. Would you be interested in taking more vocational education courses in the future?

[16] (1)_____ No

(2)_____ Yes (If you check this, please describe what specific courses you would be interested in taking):

1. _____ [ ][ ][ ][ ][ ] [17-22]

2. _____ [ ][ ][ ][ ][ ] [23-28]

If you check only (1) in Question 23, you need not answer any more questions. Thank you. If you checked both (1) and (2) in Question 23, then answer Questions 31-37.

This section is designed for those who indicated in Question 23 that they were enrolled in one or more vocational education courses. In this section, the respondent was allowed to complete information for a maximum of two courses. It was assumed that this would include most situations.

Questions 24 and 25 of Section 5 asked the respondent to describe the type of course in which he or she was enrolled. Question 26 asked where the courses were taken. The answer to this question indicated if the vocational education course was privately or publicly sponsored. Questions 27 and 28 provide information on the length of the course or courses. Question 29 asked why they enrolled. The answer to this question indicated what the respondent's specific needs were from vocational education. Question 30 allowed the respondent to state whether or not he was interested in more vocational education and if so, what specific type.

Section VI, shown as Exhibit 6 was to be completed by those persons who indicated in Question 23, Section IV, that they wished to enroll in a vocational education course but did not enroll.

Exhibit 6

VI. QUESTIONS ABOUT A COURSE IN VOCATIONAL EDUCATION IN WHICH YOU WISHED TO ENROLL BUT DIDN'T:

Answer Questions 31-38 ONLY IF YOU WISHED TO ENROLL in a vocational education course between OCTOBER, **1970** and OCTOBER, **1971**, BUT DID NOT ENROLL.

31. In what general type of vocational education course did you want to enroll? (Check only one):

(1) ____ AGRICULTURAL—(For example: farm mechanics, farm business management, agricultural chemicals, feeds, horticulture)

(2) ____ DISTRIBUTIVE—(For example: advertising, finance and credit, merchandising, transportation)

(3) ____ HEALTH—(For example: dental assistant, nursing, medical laboratory technician)

[29] (4) ____ HOME ECONOMICS—(For example: child care, clothing, family health, institutional cooking, consumer education)

(5) ____ OFFICE—(For example: accounting, cashiers, filing clerk, typist, secretary)

(6) ____ TECHNICAL—(For example: communication technician, refrigeration specialist, chemical technician)

(7) ____ TRADE AND INDUSTRIAL—(For example: carpentry, electrician, welder, machinist, cosmotologist, radio repairman)

32. What was the *specific* title of the course in which you wanted to enroll? (For example: farm power and machinery, auto body repair, legal secretary, institutional cooking):

_____ ☐☐☐☐☐☐ [30-35]

33. Where was the program taught in which you wanted to enroll? (Check one):

(1) ____ Public school (If you check this one, was it): ⇨ (1) ____ High school

(2) ____ Private school (2) ____ Post secondary vocational school [37]

(3) ____ On-the-job training with industry (3) ____ Other (describe) _____

[36] (4) ____ Apprenticeship _____

(5) ____ Other (describe) _____

(6) ____ Do not know

34. How many hours per week would you have been taking the course? (Check one):

[38] (1) ____ 3 hours per week or less (3) ____ 20 hours per week or more

(2) ____ 4-19 hours per week or less (4) ____ Do not know

35. How long would the course have been in weeks? (Check one):

[39] (1) ____ 10 weeks or less (3) ____ 24 weeks or more

(2) ____ 11-23 weeks (4) ____ Do not know

36. Why did you want to enroll in the vocational education course that you checked in Question 31? (Check the *ONE* most accurate reason):

[40] (1) ____ To get an introduction to vocational education
(2) ____ To obtain basic skills in arithmetic, reading and writing
(3) ____ To get training for my first full-time job
(4) ____ To improve my ability at my present job
(5) ____ To improve to get promoted
(6) ____ To train for a new job, not related to present or past job
(7) ____ Other (describe) _____

37. Why did you *not* enroll? (Check those that apply):

[41] ____ Course not available in local area
[42] ____ Course not available at convenient time ____ Present job did not allow time [35]
[43] ____ Could not meet admission requirements ____ Family obligations did not allow time [36]
[44] ____ Costs of attending were too high ____ More training would not have raised my income [37]
[48] ____ Other (describe) _____

38. Are you interested in taking vocational education courses in the future?

[49] (1) ____ No
(2) ____ Yes (If you are interested, please describe what specific courses you would be interested in taking):
1. _____ ☐☐☐☐☐☐ [50-55]
2. _____ ☐☐☐☐☐☐ [56-61]

You need not answer any more questions. THANK YOU.

The questions in this section parallel those in Section V except for Question 37 which asked why they did not enroll. The reasons that are listed in this question were formulated to identify specific problems that persons may have in meeting their needs for vocational education.

A copy of the complete questionnaire is shown in Appendix 1. The questionnaire as described above was formulated following a trial test of an initial copy with a small sample of rural and urban households in order to test its readibility, validity, and response rate. The next part of this report describes the trial test used to evaluate and revise the data collection questionnaire.

Trial Test of the Questionnaire

The two primary purposes for conducting the trial test were: 1) a trial test allowed the opportunity to revise the data collection questionnaire; there was a chance to add, change, or delete questions which were not appropriate before going to a larger population; and 2) an estimate could be made of the percentage return to be expected during the study.

The trial test was directed at both a rural and an urban population to discern any differences in response rate and reaction to the questionnaire. South St. Paul was selected to represent an urban area, while Lakeville (including Lakeville Township) was selected as the rural trial area.

Four SS's from each of these areas were randomly selected, using the same methods as described in the section of this chapter on sample segment selection. The four SS's chosen in South St. Paul provided 25 households or one out of every 380 in the town. Lakeville's four SS's yielded 27 households and provided a representation of one household out of each 86 counted in the 1970 census. Equal representation was not a factor here, but rural-urban representation was.

Each of the 52 households were sent a set of five questionnaires. A cover letter explaining the purpose of the trial survey was enclosed. Each packet contained a stamped, return address envelope for return of the questionnaires.

There were no pre or post letters sent. Each household was contacted by telephone about one week after the questionnaires were mailed. This telephone follow-up served two basic purposes: 1) Suggestions concerning the questionnaire were solicited. Items such as length of the questionnaire, ability to understand the questionnaire, and general reactions to the questionnaire were discussed with the recipients.

Of the 52 households sent questionnaires, telephone contact was made with 49. The remaining three households had no telephone service at the time of the trial survey. Table 7 shows that 26 of the 52 households receiving questionnaires mailed back at least one reply and that the response was generally more frequent from the rural areas than from the urban or small town areas.

The trial test predicted that a response rate of approximately 50 percent might be expected. It also revealed that the telephone contact provided additional responses. Before telephone contact was made, 17 households had sent their replies; an additional nine sets of questionnaires were mailed after telephone contact had been made.

The trial test permitted the instrument to be clarified and the questions made easier to understand. The format was changed from eight single pages to a six page fold-out. Based on the trial test it was decided that sending five questionnaires to each household sampled would be adequate in most cases.

TABLE 7

RESULT OF TRIAL TEST

	No. Hshlds. Selected	No. Hshlds. Contact Teleph.	No. Hshlds. Responded	No. Ques. Rec'd.	% Hshlds. Responded	No. Question/ Hshld.
URBAN AREA	25	24	8	19	32.0	2.4
RURAL AREA	27	25	18	52	66.7	2.9
Total	52	49	26	71	50.0	2.7

The next section describes how the data collection procedures were administered to the sample of households selected in Steele County. Many of the administration procedures were carried out more smoothly because the staff had the experience of the trial test of the data collection instrument.

ADMINISTRATION OF THE QUESTIONNAIRE

It appeared that one of the keys to successful administration of the data collection instrument was to inform the public of the purpose of the study. If it were possible to inform the community leaders adequately, some of the apprehension about completing the instrument might be dissipated and the percentage of persons returning the questionnaire increased. The information process included the use of available mass media in the area as well as personal contact by letter, telephone and visit to the key community leaders.

Publicity for Data Collection

Two weeks prior to mailing the first questionnaires, a news story was sent to the newspaper editors of those papers that served the Steele County area. This article stressed that the study was being done to help school administrators plan vocational education programs for residents of Steele County, and that a response from those selected was very important to the success of the study. Within a week of the time the news articles were sent to the papers, a news release was mailed to each of the radio stations that serve the Steele County area. It was stressed that the study was educational in nature, that no one was being asked to buy anything, and that only one out of five residents would be contacted for the study.

A second news release was sent to the newspapers for release the week that the first questionnaires were to be mailed. This article again stressed the use that could be made of the information collected for vocational program planning and urged those selected to respond as soon as possible.

Further publicity was given the study three weeks later. Taped interviews were held with the news editors of local radio stations. One tape was broadcast on a morning and evening news and farm show; the other was presented as part of the area news program twice during that week. This was a reminder to those who had received questionnaires that it was important that they respond soon and that their reply would be most helpful in the conduct of the study. It also provided added publicity for the interview session to be held the following weekend.

In order to increase awareness of the study, and thereby increase the chances that people would respond, the support of the community leaders was solicited via personal letter. A personally addressed letter was mailed to each of the following: (1) Steele County Commissioners; (2) Mayors of the four largest communities; (3) the County president of each of the three farm organizations (Farm Bureau, Farmer's Union, National Farmers Organization); (4) the president of each of the Parent Teacher Associations in the school systems; (5) the superintendents of each of the school systems in the county; (6) instructors of vocational subjects in all of the schools in Steele County, including private and parochial schools. The letter sent to each organization included an offer to speak to their members if they wished to extend such an invitation to the project directors.

Each of these letters was designed to enlist the support of those to whom it was addressed. The basic reason for contact was that these people were in a position to assist the survey by informing their respective peer groups that the study was going to be done for the benefit of residents of Steele County, and that in order to have a successful furvey their help was imperative. It also seemed likely that if influential persons knew about the study beforehand, they would be more willing to support the survey and encourage others to respond.

Each superintendent of the public schools in Owatonna, Medford, Blooming Prairie, and Ellendale, and the superintendent of the private high school in Owatonna was visited by one of the project directors. This visit provided an opportunity for the superintendents to ask questions concerning the survey, its purpose and use, and how they might obtain results pertaining to their school district.

It was believed that the amount of publicity given the survey would assure that most of the residents of Steele County would be aware of the survey, and they would be assured of its intent and purpose.

Sampling

According to 1970 Census Data[2] there were 8900 households in Steele County. A twenty percent sample meant that 1780 households had to be randomly sampled from this population. This task was accomplished as described in the section of this chapter entitled "The Sample".

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[2]Minnesota Analysis and Planning Systems, University of Minnesota; St. Paul, Minnesota.

Data Collection Methods

To administer the instrument, four basic methods were selected: 1) direct mail to each potential respondent's household; 2) direct mail to each potential respondent's household and telephone follow-up, 3) direct mail to each potential respondent's household with incentive for return of questionnaire, and 4) group interview at a central location or personal interview at the respondent's place of residence. The precise methods of administration such as the use of pre or post letters, mail class and interview techniques are described in Table 8. Each of the households which were contacted by direct mail or interview were sent five copies of the questionnaire, an individually addressed and signed cover letter, and a return envelope.

To test efficiency and effectiveness of various methods of collecting data about what people perceive their needs to be for vocational education, eleven variations of the data collection process were tried. The methods were selected on the basis of review of a previous study[3] that indicated several techniques could be employed to increase the response to a questionnaire. In general, any special effort the researchers made in preparing the questionnaire improved the response. The use of pre-letters, post-letters, small incentives enclosed with the questionnaires, and other simple techniques all increased the return.

The eleven treatments for data collection which were examined in this study are described in the following paragraphs. The sample segments drawn for the Steele County area (each containing approximately 6 households) were randomly assigned to data collection treatment groups, using a table of random numbers. Groups 1-9 each contained approximately 180 households (range 171-185). Groups 10 and 11 each contained only 60 households. These two latter groups used variations of the interview technique and were reduced to a sample of only 60 to stay within the limits of the project budget.

The two primary purposes of using different data collection techniques were to determine which method or methods were most effective in soliciting a response from the group surveyed; and secondly, on the basis of the number of responses received, which method(s) produced returns for the least cost.

Table 8

DESCRIPTION OF DATA TREATMENT GROUPS

Group One:	Questionnaires delivered <u>first class</u> mail, with cover letter Return envelope enclosed Post-letter mailed ten days following questionnaire

[3] Pucel, David J., et. al., Questionnaire Follow-up Returns as a Function of Incentives and Responder Characteristics, <u>Vocational Guidance Quarterly</u>, March, 1971.

Group Two: Questionnaires delivered third class mail, with cover letter
Return envelope enclosed
Post-letter mailed ten days following questionnaire

Group Three: Pre-letter mailed ten days prior to questionnaire
Questionnaire delivered first class mail, with cover letter
Return envelope enclosed

Group Four: Pre-letter mailed ten days prior to questionnaire
Questionnaire delivered third class mail, with cover letter
Return envelope enclosed

Group Five: Questionnaire delivered first class mail with cover letter and an enclosed incentive
The incentive was a keyring with environmental protection theme (approximate cost of incentive, $.40 each)
Return envelope enclosed

Group Six: Questionnaire delivered first class mail with a cover letter that described how the recipient could receive a reward for retruning the questionnaire
Return envelope enclosed
Incentives mailed to those who responded to the questionnaire (approximate cost of incentives, $1.00 each)

Group Seven: Questionnaire delivered first class mail with a cover letter that described how the recipient could receive a chance to win a portable television set in a drawing (approximate cost of incentive, $90.00)
Return envelope enclosed
After the deadline described in the cover letter, a drawing was held and the portable television set delivered in person to the winner
Notification of winner to non-winners

Group Eight: Pre-letter mailed ten days prior to questionnaire
Questionnaire delivered first class mail with cover letter
Return envelope enclosed
Seven days after questionnaires were mailed, each recipient was telephoned to answer questions about the questionnaire and to urge the recipient to complete and return them
For a limited number without telephone, a special post-letter was sent to encourage response

Group Nine: Questionnaire delivered first class mail with cover letter
Return envelope enclosed
Seven days after questionnaires were mailed, each recipient was contacted by telephone as in Group Eight
A special post-letter as previously described for Group Eight was sent to those without telephones

Group Ten: Pre-letter mailed ten days prior to questionnaire
Questionnaire delivered by first class mail with cover letter explaining that someone will call on them to assist in completing the questionnaires
No return envelope was enclosed
Telephone calls to each recipient to set up interview time and place were made
Personal interviews were made with each recipient household

Group Eleven: Pre-letter mailed ten days prior to date set for interview, outlining the incentive for attending the interview session
Interview session scheduled and held as directed in the pre-letter
Incentives delivered to persons responding to the interview invitation.

SUMMARY

Before conducting a study to determine individual demand for vocational education on a large scale, it was recommended that a pilot study be initiated to investigate the effectiveness and efficiency of various ways of collecting the necessary information (as outlined in Chapter I). The pilot test was to document the reliability and validity of data collected, verify a sampling procedure, and provide estimates of effectiveness and costs of various data collection methods. A pilot test of this nature could result in considerable savings of time and money in a larger scale attempt at individual demand determination.

This chapter dealt with the questions to be answered in designing a pilot test which is to provide the information for the purpose listed in the previous paragraph. The first question was "Where, geographically, should the study be conducted?" Using criteria of population size, rural-urban split in population, availability of previously collected information, and resources available, a county in southern Minnesota was selected as the area in which to conduct the pilot test.

The second question was "Who should be asked to provide information?" Based on the age at which vocational education programs become available to persons, it was decided that the population to be studied should include everyone thirteen years of age or older. After considering the number of different vocational programs which might be of interest to the population, the accuracy with which an estimate had to be made, the resources available to conduct the study, and the expected rate of response to data collection, it was decided to take a twenty percent sample of the population.

The third question was "How should the sample be selected?" After reviewing several sampling procedures, a modification of the procedure used by Current Population Survey was adopted. Considerations in selecting this procedure were the degree to which all individuals in the area to be sampled

were included in the population, ease with which individuals included as part of the sample could be identified and contacted, amount of travel in the area versus office work required in identifying the sample, the degree of training required to identify the sample, and the cost of sampling. In the case of the selected procedure, the household was the smallest unit in the sample. Households provided a means of potentially identifying and contacting every person in the area. The procedures involve a minimum of travel in the area during sample selection; with a majority of the effort being expended in an office setting. Since the last step in selecting the sample by this procedure is the actual identification of names and addresses, the costly step of identifying all persons by name in the population is eliminated. Using this procedure the sample can be selected by a secretarial staff with minimum amount of expert direction. Because households are grouped together in sample segments, the cost of collection of data by interview at the household is reduced.

The fourth question was "On what kind of questionnaire should the data be collected?" In answering this question, a data collection questionnaire was developed based on the information needed as specified in Chapter I. The questionnaire was given a trial test and modifications were made in the original form. The trial test also provided an estimate of the expected rate of return of the questionnaire, which was used in estimating sample size.

"How should the data collection questionnaire be administered?" was the fifth question. The question involved detailing publicity in the geographic area to be sampled and specification of data collection methods to be evaluated in terms of effectiveness and efficiency. Eleven different methods of data collection were identified. These methods involved direct mail, letter and telephone follow-up, incentives, and personal interviews.

Based on answers to these five questions, a design for the pilot test was formulated. The next chapter deals with the results of implementing the design.

Chapter III

DETERMINATION OF INDIVIDUAL DEMAND. ANALYSIS OF AND CONCLUSIONS ABOUT SELECTING A METHOD

The analysis of the data collected was directed at answering the following questions which parallel the objectives of this study:

1. What is the cost and effectiveness of various methods of collecting data to estimate individual demand for vocational education?

2. Did the sampling procedure result in a representative sample of individuals in the geographic area?

3. Can valid and reliable information to ascertain individual demand for vocational education in a given geographic area be attained from a sample of individuals in that area?

4. Can valid and reliable information on school, job, and geographic mobility be obtained at the same time and source as individual demand for vocational education?

The analysis of data to answer each of these questions will be dealt with in the following sections in the order stated above. Following the explanation of data analysis for each question, conclusions resulting from the analysis are formulated.

EFFECTIVENESS AND EFFICIENCY OF DATA COLLECTION METHODS

Both effectiveness and efficiency were criteria used to measure the value of the various kinds of data collection techniques. For this paper, effectiveness is defined as the percent response obtained by the data collection method. Effectiveness was determined by dividing the number of households which returned questionnaires by the number of households where questionnaires were delivered. In almost all cases, the number of households receiving questionnaires was less than the number originally mailed because of improper addresses or some other reason which caused the U.S. mail service to not deliver the questionnaire.

Efficiency is defined as the actual cost of obtaining each return without regard to the effectiveness of the method. For example, if method A costs $2.00 per return and method B costs $4.00 per return, method A is considered to be more efficient. The fact that method A may have stimulated only a 20 percent return as compared to the 40 percent return for method B is not considered.

To measure efficiency, it was necessary to first calculate the costs of each method of data collection. Costs were calculated for each operation. The individual cost for each operation or function is listed in Table 9.

Table 9

APPROXIMATE COSTS OF FUNCTIONS ASSOCIATED WITH DATA COLLECTION

Item	Cost/Unit
Questionnaires (Cost/each - 5/respondent)	$.057
Envelopes for Questionnaire mailing and return	.061
Envelopes for pre and post letters	.010
Postage for questionnaires, Third Class	.160
Postage for questionnaires, First Class	.400
Postage for pre and post letters	.080
Postage for questionnaire returned (average)	.300
Addressing envelopes	.050
Addressing letters	.050
Folding-stuffing	.015
Applying stamps	.020
Sealing envelopes	.015
Typing address stickers	.040
Applying stickers	.010
Sticker cost	.010
Staff time per hour	7.000
Secretarial time per hour	3.000

Each method of data collection accumulated a different cost because of the inclusion and exclusion of some of the items listed in Table 9.

In all data collection methods explored, the known techniques for stimulating response were employed. For example, each letter was addressed to a specific person rather than to "Resident". Questionnaires and letters were mailed using attractive commemorative stamps rather than the less attractive common postage stamps or metered postage. This simple refinement was an asset to the project. On numerous occasions, the respondents, when telephoned, first denying that they had received the questionnaire, would recall that they had received the envelopes with the attractive stamps.

Effectiveness

To gather data that is reliable for estimating the vocational education needs of people it is important that a reasonable number of persons contacted

respond to the questionnaire. The percent response that can be considered "reasonable" can be based more upon the validity of the sample rather than the percent that respond. However, it is generally considered to be more desirable to have as large a proportion of the population as possible respond to the inquiry. Table 10 displays the response obtained by each of the data collection methods.

Table 10

THE EFFECTIVENESS OF ELEVEN METHODS OF DATA COLLECTION

	Method	No. in Sample	No. Delivered	No. Returned	Percent Response
1.	Questionnaire - First Class Post-Letter	176	176	80	45.4
2.	Questionnaire - Third Class Post-Letter	171	157	77	49.0
3.	Pre-Letter Questionnaire - First Class	175	172	59	34.3
4.	Pre-Letter Questionnaire - Third Class	182	160	72	45.0
5.	Questionnaire with Enclosed Incentive - First Class	185	181	67	37.0
6.	Questionnaire with Incentive Upon Return - First Class	185	181	67	37.0
7.	Questionnaire with Risk Incentive - First Class	180	180	65	36.1
8.	Pre-Letter Questionnaire - First Class Telephone Follow-up	176	173	111	64.6
9.	Questionnaire - First Class Telephone Follow-up	173	170	107	62.9
10.	Pre-Letter Telephone appointment Personal interview	60	58	48	82.8
11.	Pre-Letter Group Interview with Incentive	60	57	9	15.8

When measured by the percent response in Table 10, the personal interview is the most effective means of obtaining responses (Method 10). About eighty-three percent of those contacted agreed to respond to the structured interview.

Follow-up activity appears to be more important to an effective data collection technique than does any method of invitation (pre-letter) or payment for participation (incentives); the more personal the follow-up activity, the more effective the method. The interview at the place of residence was the most effective, followed by the personal telephone contact. Where post letters were used (Methods 1 and 2) the resulting response was higher than where only an invitation (pre-letter) preceeded the receipt of the questionnaire.

None of the methods which included token payment for services (incentives) were particularly beneficial in obtaining a high level of response. It is useful to note, however, that regardless of the kind of incentive used, the rate of return was not significantly different from any other incentive plan. Those who received a simple key chain reward along with the questionnaire responded as well as those who received a more elaborate gift or a chance to win a television set upon return of the questionnaire.

The group interview technique with a positive incentive ($5.00 in coin) failed to attract a significant number of respondents. In spite of the fact that the interview site was conveniently located with no problems in access or parking, conflicting community activity, an interview time schedule that would fit any combination of leisure time hours, and very good weather, the method was not effective. A check on the location of the sample in relation to the interview site showed distance of travel not to be a deterrent. More of the nine families who responded were rural than urban. One group (a sample segment of six households) resided within three city blocks of the interview site and not a single family responded to the invitation to stop in for an interview and receive a sack of coins.

It was anticipated that the response ratio on questionnaires received by first class mail would be higher than those received by third class mail. The tendency of persons to disregard third class (junk mail) material may have been negated by the decision to use commemorative stamps on all questionnaires. Having received the questionnaires stamped with colorful, attractive commemorative wild-life stamps probably caused all but the more astute observers to regard the envelope as important material. The colorful stamps did catch the eye of many respondents as evidenced by the responses during the telephone interview. The mention of a large envelope with colorful wild-life stamps triggered recall in many that they had indeed received the questionnaire in the mail.

Another question to be answered by the pilot study in determining "people needs" for vocational education was, "Are certain data collection methods more effective in urban versus rural areas?" In answering this question, the percent of questionnaires returned of the number of households selected in rural and urban areas was calculated. These percentages for each data collection method and in total are shown in Table 11. It appears that there is not a meaningful difference in effectiveness of any of the methods in an urban versus rural area.

Table 11

EFFECTIVENESS OF METHODS
IN RURAL VERSUS URBAN SETTING

	Urban			Rural		
Method	Number Selected	Number Returned	Percent Returned	Number Selected	Number Returned	Percent Returned
1	125	50	40	52	22	42
2	102	38	37	69	27	39
3	124	40	32	51	16	31
4	130	39	30	52	22	42
5	120	31	26	58	14	24
6	155	51	33	30	9	30
7	100	45	45	80	25	31
8	107	57	53	65	35	54
9	118	53	45	58	30	52
10	26	22	89	34	29	85
11	47	6	13	3	13	23
TOTAL	1154	439	38	552	235	43

The effectiveness measure (percent response) must be considered along with efficiency and validity of the data before a data collection technique is chosen. The validity of the sample is verified by the comparison of sample data with known parameters of the population. Factors such as age and sex are known for both the sample and the population, as well as data on previous schooling.

Efficiency

Efficiency in this study has been defined simply as the cost of obtaining a response. The costs of each data collection technique have been compiled by reference to the table of costs (Table 9) and the log of activities that was kept on each method. Variations in costs depended on the class of mail used, the inclusion of pre- or post-letters, the purchase of incentives, the expenses of travel (e.g. lodging and meals associated with data collection), the differentials in secretarial and staff time for interviews and other associated activities.

Table 12 displays the costs associated with each method and the resulting cost for each response received.

Table 12

EFFICIENCY OF ELEVEN METHODS OF DATA COLLECTION

Method*	No. in Sample	Number Delivered	Number Responded	Total Cost	Cost/ Delivered Questionnaire	Cost/ Completed Questionnaire
1	176	176	80	216.86	1.36	3.00
2	171	157	71	166.26	1.21	2.45
3	175	172	59	211.16	1.33	3.88
4	182	160	72	163.48	1.16	2.57
5	177	173	61	242.34	1.51	4.27
6	185	181	67	270.66	1.61	4.34
7	180	180	65	305.49	1.81	5.00
8	176	173	111	342.69	2.20	3.42
9	173	170	107	300.85	1.96	3.11
10	60	58	48	448.69	7.73	9.35
11	60	57	9	481.06	8.43	53.45

*For more complete explanation of each method refer to Chapter II, Administration of the Questionnaire.

Time Required for Sampling and Coding

In the previous section, a cost analysis for each method used to elicit responses was presented. The costs included were specific to the method. Other costs would have been incurred regardless of the method used to encourage returns. These costs involved the sampling procedure, selection of sampling segments, selection of households, and coding the questionnaires for keypunching. The time required and rate of completion for these activities is shown in Table 13.

The sampling procedure required the following tasks:

1. List all ED's in order of population size and then record the number of households in each ED (time = 1 hour)

2. Determine the number of sample segments (SS's) in each ED (time = 1 hour)

3. Calculate a cumulative total of the SS's in the ED's (time = 1/2 hour)

4. Select a random number, then list the numbers used to determine the number of SS's to be selected from each ED (time = 1 hour)

These four tasks required a total of about four hours.

Table 13

TIME REQUIRED AND RATE OF COMPLETION FOR ACTIVITIES
NOT RELATED TO METHOD OF DATA COLLECTION

Activity	Rate* Per Hour	Total Hours
List ED's in order of size	N.A.	.5
Record Number of Households	N.A.	.5
Determine Number of SS's/ED	N.A.	1
Calculate Cumulative Total SS's/ED	N.A.	.5
Select Random Number, List Numbers Used	N.A.	1
Locate Households on Map	175	50
Divide Households into Groups of Six	580	15
Number of SS's	290	5
Select SS's with Table of Random Numbers	20	15
Compile Names and Addresses of Household	80	20
Code Questionnaire, Pre-Mail	300	15
Code Questionnaire for Keypunch	40	39

*N.A. means "not appropriate" for this activity.

Once the number of SS's to be selected from each ED was determined, it was possible to draw the sample and identify households. The task of locating all the households in Steele County was the largest single task. It required approximately fifty hours to locate all the dwelling units in Steele County once the appropriate references and maps had been secured. Another fifteen hours was devoted to dividing households into groups of six, observing all ED boundaries, and considering geographic boundaries such as highways and waterways.

When the SS boundaries had been established, each had to be numbered in serpentine fashion in preparation for the random sampling process. This task required approximately five hours for all of Steele County. The random selection of SS's with a table of random numbers required about fifteen hours of time. This involved listing the total number of SS's in each ED, determining the numbers that would be sampled and locating those SS's.

The names and addresses of the householders selected were compiled and identified as to ED, SS number and school district. These lists were assembled at the rate of about eighty households per hour, for a total time requirement of twenty hours.

Each questionnaire was coded for identification of method of data collection, ED and school district before it was mailed. This was done at the rate of three hundred questionnaires per hour. Since 4500 questionnaires were coded, about fifteen hours of time was used.

Upon return of a completed questionnaire, it was coded for keypunch. Information as to place of residence was coded for all returned questionnaires. Employed respondents' questionnaires were coded as to location of employer, type of industry and type of occupation. Coding for location involved the specification of a code for each community in Minnesota with a post office and special codes for other states. The coding system used for type of industry and occupation was taken from the Alphabetical Index of Industries and Occupations, developed by the U.S. Department of Commerce, 1971.[1] Additional coding was required for those questionnaires that indicated enrollment in a course or the desire to enroll in a course. Here, the Office of Education Vocational Subject/Activity List[2] coding system was used to identify each specific course by title. The completed questionnaires were coded at a rate of about forty per hour; with 1550 questionnaires this amounted to thirty-nine hours of time.

REPRESENTATIVENESS OF SAMPLE

A first check on the validity of the data collected in terms of its use in determining individual demand for vocational education is to ascertain if the respondents are a representative sample of the population (in this case the individuals living in Steele County). This check is especially important since the rates of return for the data collection methods varied from eighty-three percent to only sixteen percent of the sample.

Three analyses were conducted to determine representativeness of the sample. First, the respondents to each of the data collection methods were compared to see if they were representative of the same population. Second, the respondents to all data collection methods were pooled and compared to the respondents of the data collection method involving an actual interview, which had the highest rate of return (eighty-three percent). Third, the respondents to all data collection methods were pooled and compared to descriptive data available on the population in Steele County. Each of these analyses and their resulting conclusions will now be explained.

Comparability of Respondents in All Data Collection Methods

The purpose of comparing respondents from all data collection methods was to determine the variability between groups of respondents from the different methods in order to support their pooling together for further data analysis. Table 14 shows a comparison of all methods on the characteristic of age and sex. For each data collection method, the number and percent in each of several age groups and for each sex is stated. A chi-square analysis comparing the age

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[1] "Alphabetical Index of Industries and Occupations", Bureau of Census, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C., June, 1971.

[2] "Vocational Subject/Activity List", Minnesota State Department of Education, Division of Vocational-Technical Education, 1971.

Table 14

COMPARABILITY OF RESPONDENTS IN ALL DATA COLLECTION METHODS

	Methods																					
	1		2		3		4		5		6		7		8		9		10		11	
Age	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
13 or less	7	4.5	12	7.9	3	2.5	12	7.9	9	8.3	8	5.8	9	5.7	9	4.5	11	5.2	6	4.7	3	12.0
14-17	16	10.0	22	13.9	19	15.6	19	12.5	23	21.1	15	10.9	27	17.2	30	14.9	34	15.9	19	14.7	4	16.0
18-21	8	5.0	9	5.7	4	3.3	15	9.9	5	4.6	7	5.1	13	8.3	14	7.0	20	9.4	9	6.9	0	0
22-24	12	7.6	7	4.4	6	4.9	7	4.6	3	2.8	14	10.2	8	5.1	4	1.9	8	3.8	5	3.9	0	0
25-64	90	57.0	93	58.9	79	64.8	91	59.9	57	52.3	82	59.9	89	56.7	122	60.7	125	58.9	78	60.5	17	68.0
65 +	24	15.3	15	9.5	11	9.0	8	5.3	12	11.0	11	8.0	11	7.0	22	10.9	15	7.0	12	9.3	1	4.0
Sex																						
Male	83	52.9	75	48.4	56	45.2	76	49.4	54	49.1	65	47.8	85	53.8	105	51.2	102	48.6	60	46.5	13	52.0
Female	74	47.1	80	51.6	68	54.8	78	50.6	56	50.9	71	52.2	73	46.2	100	48.8	108	51.4	69	53.5	12	48.0

and sex distribution of respondents, considering all data collection methods at one time, indicated there was no distribution difference overall at the .05 level for either age or sex. While a chi-square analysis comparing all data methods at one time may hide significant differences between individual methods, a visual check of Table 14 will reveal that this is not likely the case in this instance. Based on this test, it appears that the respondents to the various data collection methods could reasonably be pooled.

Comparability of Respondents in Data Collection Method with Highest Rate of Return and Respondents of All Other Data Collection Methods

The data collection method with the highest rate of return was the personal interview with a return of eighty-three percent. The purpose of comparing respondents in all other data collection methods to the personal interview respondents was to determine more specifically if the respondents to methods with lower rates of return were representative of the same population as respondents to the data collection method with highest return (assuming the method with highest rate of return produced results which were most representative).

This comparison is a first step in determining if the sample of all respondents are representative of the population in Steele County. The personal interview respondents, because of their high rate of return and because the sampling method was designed to be random, should provide a good approximation of the characteristics of the population. In this way, these respondents served as a first base line to which respondents to other data collection methods could be compared to determine their representativeness of the population in Steele County.

In making this comparison, respondents to all other methods (other than the personal interview) were pooled to form a new group. The pooled group was then compared to the respondents of the personal interview on the characteristics of age, sex, grade of school completed as of 1970, occupation and industry in 1970 if employed, and demand for vocational education. For each group, the number and percent of respondents in various categories are shown in Table 15.

As is evident, there is very little difference between the two groups in terms of the percent in various categories on any of the characteristics compared. A chi-square analysis comparing the distribution on each characteristic of respondents in each group was performed to see if any of the differences in distribution were significant. The results are shown in Table 16; none were significant at the .05 level.

On the basis of this comparison, it seems that the respondents to all methods other than the personal interview are representative of the same population as those responding to the interview. Further, if the respondents to the personal interview are representative of the total population in Steele County because the sample was designed to be random, and because their response rate was high, then the respondents in this study are a representative sample of the population in Steele County.

Table 15

COMPARISON OF RESPONDENTS OF METHOD 10
AND RESPONDENTS OF ALL OTHER DATA COLLECTION METHODS

Category	Method 10		All Other Methods	
	Number	Percent	Number	Percent
AGE				
13 or less	6	4.7	81	5.7
14-17	19	14.7	209	14.6
18-21	9	6.9	95	6.6
22-24	5	3.9	69	4.8
25-64	78	60.5	845	59.2
65+	12	9.3	130	9.1
SEX				
Male	60	46.5	714	49.8
Female	69	53.5	720	50.2
GRADE IN SCHOOL COMPLETED				
12 or less	100	77.5	1089	76.0
Post High School	29	22.5	344	24.0
HOURS WORKED IN 1970				
None	55	42.9	649	44.7
Less than 20	9	7.0	100	6.9
20-35	6	4.7	78	5.4
More than 35	58	45.4	624	43.0
OCCUPATION (1970)				
Professional, Technical & Kindred	1	1.4	93	11.9
Managers and Administrators, except Farm	9	12.9	100	12.8
Sales Workers	6	8.6	60	7.7
Clerical and Kindred	13	18.6	135	17.2
Craftsman and Kindred	8	11.4	79	10.1
Operatives, except Transportation	9	12.9	78	10.0
Laborers, except Farm	8	11.4	42	5.4
Farmers and Farm Workers	12	17.1	112	14.3
Service Workers	4	5.7	84	10.7
INDUSTRY (1970)				
Agriculture, Forestry & Fisheries	15	20.8	126	15.9
Construction	2	2.8	45	5.7
Manufacturing, Durable Goods	20	27.8	157	19.8

Table 15 continued

Category	Method 10		All Other Methods	
	Number	Percent	Number	Percent
Manufacturing, Non-Durable Goods	3	4.2	37	4.7
Transportation	1	1.4	32	4.0
Wholesale and Retail Trade	10	13.9	135	17.0
Finance, Insurance, and Real Estate	8	11.1	69	8.7
Business and Repair Services	0	0.0	13	1.6
Personal Service Workers	3	4.2	16	2.0
Entertainment and Recreation Service	2	2.8	3	.4
Professional and Related Services	8	11.0	121	15.2
Public Administration	0	0.0	40	5.0
DEMAND FOR VOCATIONAL EDUCATION				
Enrolled	4	3.1	66	4.5
Wanted to Enroll	24	18.6	197	13.6
Did Not Want to Enroll	101	78.3	1190	81.9

Table 16

RESULTS OF CHI SQUARE ANALYSIS OF DIFFERENCE BETWEEN RESPONDENTS TO PERSONAL INTERVIEW AND ALL OTHER METHODS

Characteristic	Chi Square Value	Degrees of Freedom	.05 X^2 Value	Signif-icant?
Age	.51	5	11.05	No
Sex	.38	1	3.84	No
Grade in School Completed	.08	1	3.84	No
Hours Worked in 1970	.33	3	7.81	No
Occupation (1970)	13.10	8	15.51	No
Industry (1970	13.65	11	19.68	No
Demand for Vocational Education	2.91	2	5.99	No

Comparison of All Respondents and the Population

As concluded in the first comparison discussed above, the variability between respondents to various data collection methods on several characteristics was not significant, therefore the groups seemed to be relatively homogeneous and could reasonably be pooled into one group for further analysis. The second comparison showed that the respondents to all methods appeared to be representative of the population in Steele County. The purpose of the comparison made in this section is to determine if the sampling procedure produced a representative sample of the population in Steele County. At first it may seem fairest (to the sampling procedure) to make this determination by comparing the respondents to the personal interview, which had the highest rate of return (and therefore had highest probability of representing the sample produced by the sampling procedure). However, since there was very little difference between respondents to all methods and more specifically between respondents to the personal interview and all other methods of data collection, it was decided to compare the group formed by pooling all respondents to the population in Steele County as a final test of representativeness.

The respondents were compared to the population on the characteristics of age, sex, education (represented by grade in school completed), labor force status (employed and unemployed), and, if employed, occupation and industry. These characteristics seemed most related to validating the representativeness of the sample, particularly from the perspective of interest in ascertaining demand for vocational education. Chi square analyses were performed to determine if differences in distribution on any of the characteristics for the sample and population were significant. It was found that the distributions were significantly different at the .05 level for age, education, occupation and industry. In view of the significance of difference in distribution, it was decided to do a Chi-square analysis of the difference between sample and population for each category within characteristic (i.e. for each age group within the age characteristic). The number and percent of respondents and individuals in the population as well as the results of the Chi-square analysis for various categories of the above characteristics are shown in Table 17. Population values were obtained from 1970 Census[3] data on Steele County. Although several of the differences between the sample and the population were significant at the .05 level, the question to be answered is "Are these differences between the sample and the population meaningful in terms of how the data are used?" In the strict sense of statistical significance, one would say that the sample and the population do in fact differ on several characteristics--specifically those pointed out in Table 17. However, a look at the differences in percentage in a particular category of a characteristic (i.e. "professional" category of the "occupation" characteristic) reveals that the differences are small (the maximum difference for a category is 9.2 percent). On this basis it was concluded that although the sample is significantly different from the population in terms of several of the specific categories of the population, these differences are not meaningful when considering the use to which the

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[3]Minnesota Analysis & Planning Systems, University of Minnesota, St. Paul, Minnesota.

Table 17

COMPARISON OF SAMPLE AND POPULATION

	Sample		Population		Difference in Percent	Significance of Difference
	Number	Percent	Number	Percent		
AGE						
14-17	228	15.5	2310	12.0	-3.5	***
18-21	104	7.0	1445	7.5	.5	
22-24	74	5.0	1092	5.7	.7	
25-64	923	62.8	11314	58.7	-4.1	***
65+	142	9.7	3100	16.1	6.4	***
SEX						
Male	774	49.5	9268	48.1		
Female	789	50.5	9993	51.9		
GRADE IN SCHOOL COMPLETED (1970)						
8 or less	50	6.4	1000	10.4	4.0	***
9-12	472	60.2	6253	65.4	5.2	***
More than 12	262	33.4	2313	24.2	-9.2	***
LABOR FORCE STATUS (1970)						
Employed	833	98.0	10968	97.1	.9	
Unemployed	17	2.0	327	2.9	.9	
OCCUPATION (1970)						
Professional and Technical	108	12.5	1205	11.0	-1.5	
Managers and Administrators	110	12.7	918	8.4	-4.3	***
Sales Workers	66	7.5	634	5.8	-1.8	**
Clerical	147	17.0	1808	16.7	- .5	
Craftsman	87	10.1	1301	11.9	1.8	
Operatives	87	10.1	1629	14.9	4.8	***
Laborers, except Farm	50	5.8	364	3.3	-2.5	***
Farmers and Farm Workers	124	14.2	1549	14.1	- .2	
Service	87	10.1	1521	13.9	3.8	***
INDUSTRY (1970)						
Agriculture, Forestry, and Fisheries	141	16.2	1627	14.8	-1.4	
Mining	0	0.0	44	.4	0.0	
Construction	47	5.4	571	5.2	- .2	
Manufacturing, Durable Goods	177	20.4	2174	19.8	- .6	
Manufacturing, Non-Durable Goods	40	4.6	858	7.8	3.2	***

Table 17 continued

	Sample		Population		Difference in Percent	Significance of Difference
	Number	Percent	Number	Percent		
Transportation	33	3.8	441	4.0	.2	
Wholesale and Retail Trade	145	16.7	1890	17.2	.5	
Finance, Insurance and Real Estate	77	8.9	775	7.1	-1.9	*
Business and Repair Services	13	1.5	179	1.6	.1	
Personal Service Workers	19	2.2	508	4.6	2.4	***
Entertainment and Recreation Service	4	.5	20	.2	0.0	
Professional and Related Services	129	14.9	1597	14.6	- .4	
Public Administration	43	4.9	281	2.6	-2.4	***

Significance is based on Chi square analysis, the levels of significance reported are: * = .06 - .10; ** = .02 - .05; *** = .01 or less.

sample information will be put. At the same time, when interpreting the data analyzed from the sample as presented in the following tables and generalizing to the population, consideration should be given to the ways in which the sample tends to differ from the population.

Based on these conclusions, comparing the sample to the population, it seems reasonable to use a simple multiple of the sample to generalize to the population.[4] Using a simple multiple to generalize sample data to the population makes determination of population characteristics relative to demand for vocational education much less complex. For example, if there are one thousand persons in a population and you have a representative sample of two hundred which is twenty percent of the population, then if there are thirty persons between the age of ten and twenty in the sample you can safely estimate that there are 150 persons aged ten to twenty in the total population (the multiple is 1000 ÷ 200 or 5; 5 times 30 equals 150).

This concludes the section on analyses of and conclusions about the representativeness of the sample. Basically, it has determined that the sample was representative of the population on several characteristics of relevance in generalizing the sample data to the population for the purpose of determining demand for vocational education. The next section of this chapter will deal more specifically with the validity and reliability of the information collected in estimating individual demand for vocational education.

VALIDITY AND RELIABILITY OF DEMAND FOR VOCATIONAL EDUCATION

This section will identify and explain the data analyses and conclusions reached about the validity and reliability of information collected for use in determining individual demand for vocational education. The last part of this section will present the findings of this study concerning individual demand for vocational education in Steele County. The reliability of the information refers to whether or not the same answers would have been received if the individuals had been asked at another time or in another way. The validity of the information refers to the degree it really answers the questions wanted answered; in this case, does the information answer the question, "What is the individual demand for vocational education in Steele County?"

Reliability of Demand Estimates

The reliability of the information which was gathered to estimate demand for vocational education was built into the study to some extent. This was accomplished by asking the sample individuals to indicate their demand for vocation in the past year. Because it is about time and events which have

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[4] [If it had been concluded that the sample respondents were not representative of the population, generalization of sample data to the population could still have been made, but the sample and population would have had to be divided into sub-groups and generalizations to each sub-group made separately.]

already transpired, the same answer should result no matter when he was asked (as long as it was relatively recently for memory purposes) and how he was asked (assuming the respondent had no reason to fabricate).

Some idea of the effect of how the person was asked his demand for vocational education can be gleamed from comparing demand between respondents to the various data collection methods. This comparison of demand (enrolled, wanted to enroll, or did not want to enroll) is shown in Table 18. Since these groups of respondents have already been shown to be homogeneous with respect to other characteristics, one would expect their demand for vocational education to be homogeneous unless the way they were asked had an effect on how they answered. In Table 18 the methods of data collection have been grouped according to the four basic types represented: (1) direct mail only, (2) direct mail and telephone follow-up, (3) direct mail with incentive for return, and (4) group and individual interview. Chi square analysis of demand for vocational education was not significant at the .05 level.

Table 18

RELIABILITY OF DEMAND FOR VOCATIONAL EDUCATION
BETWEEN GROUPED DATA COLLECTION METHODS

	Enrolled		Wanted to Enroll		Did Not Want		Total	
	No.	%	No.	%	No.	%	No.	%
Group 1: direct mail only	35	5.8	81	13.5	486	80.7	602	100.0
Group 2: direct mail and incentive	17	4.2	52	12.8	338	83.0	407	100.0
Group 3: direct mail and telephone follow-up	13	3.1	60	14.2	350	82.7	423	100.0
Group 4: personal interview	5	3.3	29	18.8	120	77.9	154	100.0

Because respondents were asked about historical happenings and since there was very little variation between methods in the nature of their responses, it was concluded that the information collected was reliable for the purpose of estimating individual demand for vocational education. The next section will deal with the validity of the data, given it is reliable.

Validity of Demand Estimates

The validity of information obtained about demand for vocational education is dependent on the interpretation given the questions on the data collection instrument by the individual responding. If that interpretation is the same as intended by those who formulated the questionnaire, then the answers should be valid.

Because the information which was collected was about past events, an opportunity is provided to check actual validity of the data. This can be done by comparing what the respondents said happened with what other reliable sources report actually happened. In the case of this study, the number of individuals who said they were enrolled in a vocational education program was compared with actual enrollments in vocational education.[4] The comparisons were made for two separate groups: (1) those in high school programs, and (2) those in adult programs.

A further limitation in making these comparisons is a restriction of the geographic area in which enrollments are compared to one school district. This restriction was necessary since the source of comparison data is provided on a school district basis. In Steele County, there is only one school district which is almost wholly contained with the County. However, this school district does provide a good comparison area since it covers about two-third of the land area and population.

The comparison data on total enrollment in vocational education, as estimated from the sample and actual enrollment, is shown in Table 19. While the difference between estimated and actual is small for the adult vocational education programs, it is relatively large for the high school program. In both the high school and adult programs, the estimated enrollment is less than the actual enrollment. From this information, it appears that respondents were not able to correctly classify themselves as enrolled or not enrolled in a vocational education program.

This conclusion is substanciated by observing the data reported in Table 20. In Table 20, the enrollment by type of vocational education program as reported by the respondents and actual enrollments are compared. Although the numbers from the sample are very small and generalizations hazardous, several respondents reported being in vocational education programs which were in actuality not available in the school district. This discrepancy is particularly evident for distributive, technical, and trade and industrial education at the high school level. The discrepancy involving technical and trade and industrial education may be a confusion of these programs in the perceptions of the respondents with industrial arts. Based on actual enrollments it would also have been expected that home economics at the high school level and agriculture at the adult level would have had larger enrollments from the sample.

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[4] Actual enrollments were taken from reports of the selected school district to the Minnesota State Department of Education, Division of Vocational-Technical Education and from direct contact with the school district.

Table 19

VALIDITY OF INTENSITY OF DEMAND FOR
VOCATIONAL EDUCATION IN SELECTED SCHOOL DISTRICT

Group	Sample Enrolled	Estimated Population Enrollment[a]	Actual Enrollment[b]	Difference
High school program	17	214	381	167
Adult program	20	252	277	25

[a]Based on multiplying sample values times 12.6. Does not include enrollment in office education program.

[b]Based on actual enrollments reported to Minnesota State Department of Education, Division of Vocational Technical Education and from direct contact with the school district.

Table 20

VALIDITY OF DEMAND FOR TYPE OF VOCATIONAL
EDUCATION PROGRAM IN SELECTED SCHOOL DISTRICT[a]

Program	High School Program		Adult Program	
	Sample Enrollment	Actual Enrollment	Sample Enrollment	Actual Enrollment
Agriculture	3	118	1	110
Distributive	3	0	3	13
Health	1	0	0	0
Home Economics	1	263	2	0
Office	1	0	5	86
Technical	2	0	3	16
Trade & Industry	4	0	3	52
Not Reported	2	--	3	
Total	17	381	21	277

[a]Based on actual enrollments reported to Minnesota State Department of Education, Division of Vocational Technical Education and direct contact with the school district.

These findings lead to the conclusion that individuals, particularly at the high school level, have difficulty in classifying themselves as enrolled in public sponsored vocational education program and further in classifying themselves as to the type of vocational education program in which they were enrolled in terms of the definition the authors had for vocational education in general and by type when the questionnaire was formulated. For this reason, the data on vocational education programs in which the respondents said they were enrolled is given no further analysis. However, the information on what programs respondents wanted to enroll in but didn't may well represent what their vocational education needs are. At least, it represents what they perceive their needs to be as they interpreted the questionnaire. In the tables which are presented in the next part of this chapter, the demands of this latter group will be characterized.

SPECIFYING THE INDIVIDUAL DEMAND FOR VOCATIONAL EDUCATION

As stated in the previous paragraph, the demands specified in this part of the chapter represent the demands of those who wanted to enroll in a vocational education program as they perceive and characterize their needs. The format for the tables in which the information is presented parallels those suggested in the first chapter describing a structure for individual demand for vocational education. However, as stated above, the number of people with particular demands includes only those who wished to enroll but didn't and excludes sample information on those who were actually enrolled.

Since it was concluded that the sample is representative of the population, this allows a simple multiplier to be used in estimating population values from the sample. With a sample consisting of 1582 observations from a population of 19,860 (an eight percent sample), the multiplier in this study was 19,860 divided by 1,582 or 12.6. This multiplier (12.6) is used to estimate the population values in the following tables.

In each of the tables, the term elementary students includes only those respondents who indicated they were in the eighth grade or below and who were thirteen years of age or older in October of 1970. This means that this group is mainly composed of only eighth graders rather than members of all grade levels in elementary school.

Size of Population Who May Demand Vocational Education

The first group of individuals identified in the sample area is composed of those who could potentially be served by vocational education if resources were not limited. This group is labeled the "population who may demand vocational education". The estimated number of individuals in this population is divided into the categories of population on which vocational education funds can be used as documented in Chapter I. The number of people in each category from a population of 19,860 for 1970 is shown in Table 21.

Table 21

SIZE OF POPULATION IN 1970 WHO MAY DEMAND VOCATIONAL EDUCATION[a]

	Regular		Disadvantaged		Handicapped		TOTAL	
	Number	Percent[b]	Number	Percent[b]	Number	Percent[b]	Number	Percent[b]
Elementary Students (13 years or older)	1399	7.0	101	0.5	50	0.2	1550	7.8
High School Students	2432	12.2	252	1.3	88	0.4	2772	14.0
High School Graduates or Dropouts & Not Fully Employed	4523	22.8	1676	8.4	794	4.0	6993	35.2
Fully Employed	6073	30.6	2054	10.3	466	2.3	8593	43.3
TOTAL	14427	72.6	4083	20.6	1398	7.0	19908	100.2[c]

[a]The sample data from which this data is derived is shown in Appendix 2, Table 1. Reliability of estimates is explained in Appendix 3.

[b]Percents are of total number in population which is equal to 19860.

[c]The total is greater than the population (19860) due to rounding and sampling error.

Elementary students consist of only those who were thirteen years of age or older in October of 1970 and indicated they were in the eighth grade or lower. High school students are those who indicated they were in grades 9 through 12. Fully employed individuals were those who indicated they work thirty-five hours or more per week. High school graduates or dropouts and not fully employed were those not in elementary or high school and not employed full time (working less than 35 hours per week). Disadvantaged students were those that were not handicapped and were: (1) over seventeen years of age and had not graduated from high school (educationally disadvantaged) and/or (2) those who met any one of the following criteria for economic disadvantagement - lived in a household with more than three members and an income of less than $3,000 or in a household with more than six members and an income of less than $4,999 or in a household with more than ten members and an income of less than $7,999. The definition of economic disadvantagement approximates the definition

described in Chapter I. This definition can be modified to suit local perspectives. Handicapped individuals were those who indicated they had any one of the following handicaps: deaf, hard of hearing, speech problems, blind, partially sighted, or physically impaired. "Regular" individuals consisted of everybody who was not disadvantaged or handicapped.

As can be seen from Table 21, almost all of the individuals in the population of this area might potentially demand vocational education. Of this population 8 percent were elementary students, 14 percent high school students, 35 percent high school graduates or dropouts and not fully employed and 43 percent were fully employed. Twenty-one percent were disadvantaged and seven percent handicapped.

Using the data collected, it would be possible to reduce this population by deleting such groups as those individuals preparing for professions, those employed in the professions, and those retired from work, using a rationale that these people are really not available for vocational education. This was not done because it may not be altogether true that these individuals could not benefit from vocational education. These particular groups may still perceive that they have a justifiable need for vocational education.

Size of Population Who Wanted to Enroll in Vocational Education But Didn't

Of those persons who could potentially demand vocational education, one of the groups to be identified in this study were those who wanted to enroll in vocational education but didn't. Demands of this group represents the difference between the amount and kind of vocational education which is now being received (those who want it and were able to enroll) and the amount and kind of vocational education which the population in this area perceives it needs. The number of individuals and the category in which they fall are described in Table 22.

An individual was classified in this population if he indicated in Question 23 of the Vocational Education Needs Questionnaire (see Appendix 1) that he "wanted to enroll in a vocational education course but didn't". The category in which the individual was placed, as shown in Table 22, was determined using the same criteria as in Table 21.

The data shown in Table 22 indicates that 13.4 percent of individuals who lived in the selected geographic area and may demand vocational education (shown in Table 21) wanted to enroll in a vocational education program but didn't. The percents describing total demand for elementary students, high school students, high school graduates or dropouts and not fully employed and for those fully employed were fairly constant, 7, 14, 10, and 17 percent respectively. However, since the latter two percentages are multiplied times a relatively large group of individuals (as compared to the first two groups), the number of individuals wanting to enroll but didn't for these groups is substantial. The percents of the population who may demand vocational education, who wanted to enroll but didn't, and were classified as disadvantaged or handicapped is similar to the percent for individuals classified as regular (12 and 14 versus 14).

Table 22

SIZE OF POPULATION WHO WANTED TO ENROLL IN VOCATIONAL EDUCATION BUT DIDN'T[a]

	Regular		Disadvantaged		Handicapped		TOTAL	
	Number	Percent[b]	Number	Percent[b]	Number	Percent[b]	Number	Percent[b]
Elementary Students (13 years or older)	76	5.4	13	12.9	13	26.0	[illegible]	6.6
High School Students	277	11.4	76	30.2	38	43.2	[illegible]	14.1
High School Graduates or Dropouts & Not Fully Employed	479	10.6	164	9.8	50	6.3	693	9.9
Fully Employed	1134	18.7	252	12.3	101	21.7	1487	17.3
TOTAL	1966	13.6	505	12.4	202	14.5	2673	13.4

[a]The sample data from which this data is derived is shown in Appendix 2, Table 2. Reliability of estimates is explained in Appendix 3.

[b]Percents are of total number in population in each category as shown in Table 21 (i.e. of the 1399 regular elementary students, 76 or 5.4 percent wanted to enroll in a vocational education program but didn't).

Place of Program Sponsorship Desired by Population Who Wanted to Enroll in a Vocational Education Program But Didn't

There are several sources of vocational education, such as public schools, private schools, on-the-job training, apprenticeship programs and so forth. A question relevant to determining the needs of people for vocational education is, "From whom do they want to receive the education?" This question was intended to provide information on the extent to which individual demand for vocational education wishes to rely on public sponsored programs. The individuals who indicated they wanted to enroll in vocational education but didn't were asked this particular question (Question 33 on the questionnaire; see Appendix 1).

The population estimates based on their responses are shown in Table 23. These population estimates were calculated by first formulating a table similar to Table 23 for the sample respondents (see Appendix 2) and then multiplying the proportions derived in that table times the corresponding row totals shown in Table 22.

Table 23

PLACE OF SPONSORSHIP DESIRED BY POPULATION WHO WANTED TO ENROLL IN A VOCATIONAL EDUCATION PROGRAM BUT DIDN'T[a]

	Public School Sponsored		Non Public School Sponsored		Did Not Know	
	Number	Percent[b]	Number	Percent[b]	Number	Percent[b]
Elementary Students (13 years or older)	13	12.5	13	12.5	76	75.0
High School Students	109	28.0	31	8.0	25	64.0
High School Graduates and Dropouts not Fully Employed	243	35.0	0	0.0	450	65.0
Fully Employed	357	24.0	208	14.0	922	62.0
TOTAL	722	27.0	252	9.4	1699	63.6

[a]The sample data from which this data is derived is shown in Appendix 2, Table 3. In this derivation it is assumed that persons who completed this question would distribute themselves the same as those who did not answer the question in terms of desired place of sponsorship. Reliability of estimates is explained in Appendix 3.

[b]Percents are of total number in the category who wanted to enroll in vocational education but didn't as specified in Table 22 (i.e. of the total of 102 elementary students who wanted to enroll in vocational education but didn't, 12.5 percent wanted to enroll in a public school.

The responses given on the questionnaire were categorized into public school sponsored, non-public school sponsored (included those checking private school, on-the-job training with industry and apprenticeship program), and those who did not know the place of sponsorship for the course in which they wanted to enroll. From the "total row" in Table 23 it is evident that almost two-thirds (64%) of the respondents did not know the place of sponsorship. About one-fourth (27%) wanted public school sponsored courses. The complete absence of demand for non-public sponsored courses by high school graduates and dropouts not fully employed may be due to sampling error. The relatively small desire for non-public school sponsored courses over all (9%) and particularly for adults (14%) may attest to a general lack of knowledge by this group of individuals of the opportunities these sponsors provide for vocational education. Another interpretation might be that the respondents did not consider education provided by non-public sources to be vocational, although they are included in the definition of vocational education provided on the questionnaire (see Appendix I for copy of questionnaire).

The most striking conclusions from Table 23 are: (1) the general lack of knowledge about where the respondents could enroll in the vocational education course in which they wanted to enroll (indicating that either the course was not available or adequate communication had not been achieved) and (2) the relatively high proportion of those high school graduates and dropouts not fully employed and those fully employed who desired public school sponsored courses (as opposed to non-public school sponsored courses). This latter need tends to document (based on the perception of respondents) a need for expanded public school sponsored vocational education programs.

Needs of Population Who Wanted to Enroll in Vocational Education But Didn't

As described in Chapter I, this section interprets the fourth level of information about individual demand for vocational education. The needs of a given population are explained along four dimensions or characteristics: accessibility, needs and abilities, interests, and reasons for not enrolling. Accessibility to vocational education as a basic need is described by the age of respondents and their location in the selected geographic area. For the planner of vocational education programs, age indicates the level of school (i.e. elementary, high school, etc.) at which the program should be provided, and location indicates geographically where the program should be.

Needs and ability indicates the reason why the respondents wanted to enroll and thereby indirectly their ability with respect to preparation to enter or advance in the labor force (a critical piece of information in planning educational courses to meet the needs of the individuals). The categories of needs and ability are as specified on the questionnaire:

1. To get an introduction to vocational education

2. To obtain skills in arithmetic, reading, or writing (basic study skills prerequisite to further vocational education)

3. To gain training for my first full-time job

4. To improve my ability at my present job

5. To improve to get promoted

6. To train for a new job, not related to present or past job.

Need, as characterized by the third dimension, interests, is described in terms of the general and specific type of course in which the respondents wanted to enroll. This dimension provides the planners of vocational education with information about the type of course to be offered. The demand for different types of courses was summarized according to the traditional categories of vocational education: agricultural, distributive, health, home economics, office, technical, and trade and industrial (see Question 31 on questionnaire). The specific type of courses demanded was derived by coding open-ended question asking for a more specific description of the courses in which they wanted to enroll, using the U.S. Office of Education Instructional Course Codes.[5] The number of respondents with any given code was then summarized using the course title assigned to that particular code. Since the number of respondents who wanted to enroll but didn't in any one specific vocational course is small, and therefore generalization of this number to the population hazardous, only the names of courses where at least one person in the sample was interested are listed.

"Reasons for not enrolling" as a dimension of need for vocational education was used to describe the specific impediments individuals in the selected geographic area were having in fulfilling their demands for vocational education. Providing vocational education courses at the right age level and location, at the right ability level, and of the right type will not be enough; this last dimension indicates road blocks that will have to be removed before these individuals will even be able to enroll. These roadblocks indicated the most immediate or highest priority problems to be solved in planning to meet the needs of this group. The reasons provided on the questionnaire were as follows:

1. Course not available in local area

2. Course not available at convenient time

3. Could not meet admission requirements

4. Costs of attending were too high

5. Present job did not allow time

6. Family obligations did not allow time

7. More training would not have raised my income

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[5] "Vocational Subject/Activity List", Minnesota State Department of Education, Division of Vocational-Technical Education, 1971.

Information on "needs of the population who wanted to enroll in vocational education but didn't" is summarized in Tables 24-27 for elementary students (age 13 or older), high school students, high school graduates and dropouts not fully employed, and the fully employed, respectively. These tables include all respondents regardless of place of sponsorship where they wished to enroll. This grouping was made because these respondents represent a group whose demands are not being met and are therefore potential enrollees for any sponsoring source. In each table, the first column of numbers indicates the number of respondents in the sample with a particular need characteristic and the second column indicates an estimate of the number of people in the population of the selected geographic area with that need characteristic. The population estimate is derived by using the multiplier, 12.6 (the ratio of sample size to population) and rounding to the nearest whole number.

From the set of tables it is evident that there is a wide diversity in the specific interests of those who wanted to enroll in a vocational education course. Since the elementary school students (age 13 or older) are a very small group, the documentation of their needs should be treated with caution. For this group, it would be premature to state specific conclusions except to point out the interest in trade and industry programs. Elementary students who were 13 years old or older were included in the population because they are at the educational grade level (8th grade) when vocational education courses generally become available to them.

The high school students (Table 25) had greatest interest in office and trade and industrial programs. Their needs and ability, as indicated by reason why they wanted to enroll, was varied. The age group expressing the most demand was age 16, which corresponds to roughly the 10th grade. Of the reasons listed on the questionnaire for not enrolling, unavailability at convenient time and in local area were most common.

Those interested in post-secondary vocational education programs are characterized in this study mainly by high school graduates or dropouts and those not fully employed (Table 26). About four-fifths of the group were over 24 years of age. Information on needs and ability indicates the two most common reasons for enrolling were training for new job (presumably one at which they could be fully employed) and training for first job. Their most common general interests were health, home economics, and office education courses. Primary reasons listed for not enrolling were family obligations, not available in local area and not available at convenient time.

The last category, those fully employed (Table 27), represents those who might be demanding adult or continuing education. Their age distribution was about the same as for the previously described group. Most important reasons for enrolling were to improve ability at present job and train for new job. Vocational course areas of highest interest were trade and industry, office, and distributive education. As with the previous group, they expressed a great diversity of specific course interests.

Conversion of sample results into population estimates for these four categories of people provides information useful in future program planning. The population figures on interests indicate intensity of demand for various types of courses. Information on age clarifies at what school level (i.e. elementary, high school, post high school) the need exists. The location of the individuals should be helpful in determining where to geographically locate courses. Population estimates of number of individuals with various reasons for wanting to enroll characterizes the purpose toward which courses should be directed. Reasons for not enrolling indicate the problems to be solved before those who wanted to enroll but didn't would apparently be able to enroll. From the large number of respondents who indicated "other reason" as the reason why they were not enrolled, it is apparent that additional specific reasons for not enrolling should be added to the questionnaire.

Table 24

NEEDS OF POPULATION WHO WANTED TO ENROLL IN VOCATIONAL EDUCATION BUT DIDN'T: ELEMENTARY SCHOOL STUDENTS[a]

		Number in Sample	Estimated Number in Population[b]
Total		8	76
Accessibility			
Age:	13	2	25
	14	5	50
	15	1	13
	No response	0	--
Location:	Owatonna	6	63
	Other	2	25
	No response	0	--
Needs and Ability			
Introduction to vocational education		1	13
Training for first job		2	25
Improve ability at present job		1	13
Training for new job		1	13
Other		3	38
No response		0	--
Interests			
General:	Health	1	13
	Office	1	13
	Trade and industry	6	63
	No response	0	--
Specific:	Practical Nursing	1	
	Secretarial	1	
	Auto body & fender mechanics	2	
	Automotive mechanics	1	
	Electrician	1	
	Trade & industry occupations	1	
	Machine shop operations	1	
Reasons for Not Enrolling			
Not available in local area		1	13
Could not meet admission requirements		2	25
Other reasons		3	38
No response		2	--

[a] Includes only students 13 years old or older and still in elementary school in October of 1970. Reliability of estimates is explained in Appendix 3.

[b] Since the number in the sample who were in elementary school and wanted to enroll in vocational education but didn't is very small, these generalizations to the population should be interpreted with a great deal of caution.

Table 25

NEEDS OF POPULATION WHO WANTED TO ENROLL IN VOCATIONAL EDUCATION BUT DIDN'T: HIGH SCHOOL STUDENTS[a]

		Number in Sample	Estimated Number in Population
Total		31	391
Accessibility			
Age:	14	2	25
	15	5	63
	16	10	126
	17	6	76
	18	7	88
	19	1	13
	No response	0	--
Location:	Blooming Prairie	7	88
	Ellendale	5	63
	Medford	2	25
	Owatonna	15	189
	Other	2	25
	No response	0	--
Needs and Ability			
Introduction to vocational education		3	38
Training for first job		6	76
Improve ability at present job		4	50
Train for new job		5	63
Other		10	126
No response		3	--
Interests			
General:	Agricultural	3	38
	Distributive	1	13
	Health	5	63
	Home Economics	1	13
	Office	9	113
	Technical	1	13
	Trade and Industrial	11	139
	No response	0	--
Specific:	Agricultural Production	2	
	Agricultural Supplies	1	
	Distributive Education	1	
	Practical Nursing	2	
	Medical Lab Assistant	1	
	Medical Services	2	
	Home Management	1	

Table 25 continued	Number in Sample	Estimated Number in Population
Secretarial training, medical	1	
Computer programming	1	
Office education	4	
Secretarial training, legal	2	
Secretarial training, general	1	
Accounting	1	
Technical education	1	
Engineering, stationary	2	
Trade and industry related	1	
Small engine repair	1	
Automotive mechanics	3	
Cosmetology	1	
Welding related	1	
Auto body and fender mechanic	1	
No response	0	
Reasons for Not Enrolling		
Not available in local area	5	63
Not available at convenient time	6	76
Present job did not allow time	2	26
Other reason	17	214
No response	3	--

[a]Reliability of estimates is explained in Appendix 3.

Table 26

NEEDS OF POPULATION DEMANDING VOCATIONAL EDUCATION:
HIGH SCHOOL GRADUATES OR DROPOUTS AND NOT FULLY EMPLOYED[a]

		Number in Sample	Estimated Number in Population
Total		55	693
Accessibility			
Age:	21 or less	10	126
	22-24	2	25
	25-64	40	517
	No response	3	--
Location:	Blooming Prairie	7	88
	Ellendale	5	63
	Medford	5	63
	Owatonna	32	403
	Other	6	88
	No response	0	--
Needs and Ability			
Introduction to vocational education		4	50
Obtain skills in arithmetic, reading or writing		2	38
Training for first job		8	101
Improve ability at present job		5	63
Improve to get promoted		2	25
Train for new job		11	164
Other		20	252
No response		3	--
Interests			
General:	Agricultural	2	25
	Distributive	1	13
	Health	13	164
	Home economics	13	176
	Office	17	290
	Technical	3	50
	Trade and industrial	6	76
	No response	0	--
Specific:	Agricultural farm management	1	
	Agricultural, other	1	
	Retail florist	1	
	Finance and credit	1	
	Distributive, other	1	
	Psychiatric technician	1	
	Nurse's aide education	1	
	Practical nursing	1	

Table 26 continued

	Number in Sample	Estimated Number in Population
Medical lab assistant education	1	
Dental assistant education	1	
Health education, adult	1	
Health education, other	1	
House and home furnishing	1	
Adult consumer homemaking	2	
Home management	1	
Clothing and textiles	4	
Family health	1	
General homemaking	1	
Speedwriting	1	
Secretarial training, legal	1	
Clerical filing procedures	2	
Bookkeeping	1	
Typewriting	2	
Secretarial training, general	3	
Accounting	2	
Office education, other	1	
Electronics technology	1	
Law enforcement training	1	
Cosmetology	1	
Electricity, other	1	
Automotive mechanics	1	
No response	15	
Reasons for Not Enrolling		
Not available in local area	15	189
Not available at convenient time	10	126
Could not meet admission requirements	1	13
Costs of attending were too high	6	76
Present job did not allow time	5	63
Family obligations did not allow time	21	265
Other reasons	13	164
No response	2	--

[a]Reliability of estimates is explained in Appendix 3.

Table 27

NEEDS OF POPULATION WHO WANTED TO ENROLL IN VOCATIONAL EDUCATION BUT DIDN'T: FULLY EMPLOYED[a]

		Number in Sample	Estimated Number in Population
Total		118	
Accessibility			
Age:	21 or less	14	176
	22-24	6	76
	25-64	93	126
	Over 64	2	25
	No response	3	--
Location:	Blooming Prairie	6	76
	Ellendale	4	50
	Medford	6	76
	Owatonna	91	1134
	Other	11	139
	No response	0	--
Needs and Ability			
Introduction to vocational education		1	13
Obtain skills in arithmetic, reading or writing		1	13
To get first job		1	13
Improve ability at present job		43	567
Improve to get promoted		4	50
Train for new job		29	365
Other		31	378
No response		8	--
Interests			
General:	Agriculture	9	113
	Distributive	14	176
	Health	4	50
	Home economics	5	63
	Office	24	302
	Technical	8	101
	Trade and industry	49	655
	No response	5	--
Specific:	Agricultural business management	1	
	Agricultural farm mechanics	1	
	Agricultural farm management	2	
	Agricultural animal science	2	
	Agricultural production	4	

Table 27 continued

	Number in Sample	Estimated Number in Population
Insurance	1	
Business law	1	
Management	3	
Real estate	2	
Hotel and lodging	1	
Finance and credit	2	
Advertising services	3	
Distributive, other	1	
Nurses aide education	1	
Practical nursing	1	
Dental assistant education	1	
Food services	1	
Care and guidance of children	2	
Clothing and textiles	2	
Economics	1	
Stenographic training	3	
Accounting	2	
Typewriting	3	
Secretarial training, legal	3	
Secretarial training, general	1	
Traffic manager	1	
Computer programming	1	
Computer operations	1	
Income tax procedures	1	
Bookkeeping	1	
Business education	1	
Office education	5	
Mechanical drafting	1	
Electronic technician	1	
Electronics technology	2	
Technical, other	1	
Engineering, stationary	1	
Production machinist technology	2	
Welding, combination	3	
Air conditioning & refrigeration mech.	6	
Farm machinery mechanics	1	
Related drafting	1	
Related psychology	2	
Furniture upholstering	1	
Telephone repairman	1	
Small engine repair	3	
Cosmetology	3	
Welding related	1	
Machine tool operations	6	
Printing and publication	1	
Electrician	1	
Electricity related	2	

Table 27 continued

	Number in Sample	Estimated Number in Population
Electrical wiring	1	
Diesel mechanics	1	
Carpentry	2	
Commercial art	1	
Motor vehicle mech. & repair	1	
Automotive mechanics	3	
Auto body & fender mech.	3	
Radio and TV services & repair	1	
Appliance repair	1	
Trades & industry occupations	1	
No response	7	--
Reason for Not Enrolling		
Not available in local area	41	517
Not available at convenient time	21	265
Could not meet admission requirements	3	38
Costs of attending were too high	4	50
Present job did not allow time	29	365
Family obligations did not allow time	20	252
More training would not raise income	1	13
Other reasons	30	353
No response	5	--

[a]Reliability of estimates is explained in Appendix 3.

Determining Occupational, Educational and Geographic Mobility

Occupational and Educational Mobility

Extensions of determining individual demand for vocational education were made in this study to pilot test a method of determining geographic, occupational, and educational mobility of individuals.

Occupational and educational mobility were determined by asking the respondents to specify their occupational and educational status at two points in time one year apart - October, 1970 and October, 1971. October was picked as a time because those in school would be in school and those who had graduated in June would have had time to become employed. Mobility is shown by use of a matrix with rows indicating educational and occupational categories in 1970 and columns indicating similar information for 1971. The cells in the matrix indicate the amount of movement. The matrix can be thought of as a from/to matrix; it documents the intensity of movement from each category in 1970 to each category in 1971. Individuals may stay in the same category in 1970 and 1971 or move to a different category in 1971 from that in 1970. Mobility is indicated by the latter action.

An overall estimate of occupational and educational mobility for the selected geographic area is shown in Table 28. In this table, the categories of educational and occupational status of individuals have been divided into seven major categories as follows:

1. In school only--indicated they were not employed and were in school
2. In school and employed--indicated they were employed, but less than 35 hours per week and were in school
3. Employed full time--indicated they worked 35 hours or more per week
4. Fully or Partially Unemployed--indicated they were not working 35 hours or more and could not find more work
5. Unavailable for full time work--indicated they were not working 35 hours per week or more and were not in school or not looking for more work
6. Unknown--did not indicate their occupational or educational status
7. Unclassified--indicated two or more of the above were true and were thus not able to be classified in a specific category.

The first column containing numbers in Table 28 is labeled "total in 1970". This column lists the total number of respondents who were in a particular category in 1970. The columns to the right document where those respondents were in 1971. For example, of the 290 who were "In School Only" in 1970, 238 stayed "In School Only", 23 moved to "In School and Employed" status, 16 became

Table 28

Occupational - Educational Mobility
For the Sample

Category in 1970	Total in 1970	In School Only	In School and Employed	Employed (full time)	Unemployed (partial or full)	Unavailable (for full time employment)	Unknown	Unclassified
In School Only	290	238	23	16	3	2	4	4
In School and Employed	68	8	40	14	2	0	2	2
Employed (full time)	677	2	3	637	7	22	4	2
Unemployed (partial or full)	12	1	0	3	5	2	1	0
Unavailable (for full time employment)	401	0	0	14	2	381	1	3
Unknown	79	0	2	7	0	0	70	0
Unclassified	49	1	9	3	0	7	2	27
Total in 1971	1576	250	77	694	19	414	84	38

employed full time, and so forth for the other 1971 categories. Multiplication of the numbers in the cells by 12.6 would provide estimates of the number in the population moving between any combination of categories.

A useful calculation in determining the impact of one category on another is to calculate the percent of the total number in a category who came from another category. For example, of the 677 who were employed full time in 1970, 94 percent (637) were still employed full time in 1971; the remaining six percent (40) moved out of full time employment--the majority into the "unavailable" category. Looking at the employed full-time group in 1971, which has a total of 694, 92 percent (637) were employed full time last year while 4.3 percent (16+14=30) were in school or in school and partially employed last year. In all, at least eight percent (16+14+3+14=47) entered the labor force between 1970 and 1971 and may have needed vocational education for reasons of training for a first or a new job. For the population, therefore, 47 X 12.6 equals an estimated 592 people who entered the labor force between 1970 and 1971.

Table 29 also portrays the movement of the fully employed. In Table 29 the fully employed are sub-divided into nine occupational categories. From the table it is evident that the majority of the fully employed who stay employed remain in the same occupational category. Twenty-two respondents or 3.5 percent of the total who remained employed in 1971 (637) moved to a different category of occupations. If the new occupation required new skills, these individuals may be in need of vocational education for the reasons of promotion or training for a new job (22 times 12.6 yields an estimate of 277 individuals in the population who moved between job categories). Although the numbers are small, indicating caution in generalizing, comparing the percent of new employees entering various occupational categories in 1971 who came from "other sources" indicates occupations which may be easier to enter from outside the work force. From the data in Table 29, managers have the lowest percent of total new employees (i.e. those who entered the occupation who were not in the occupation last year--seven new employees in the case of managers) entering from "other sources" (i.e. those who entered the occupation who were not employed last year--three in the case of managers or 43 percent of the total new employees who are managers in 1971) and laborers, service, professionals, and sales have the largest percent (100, 86, 83, and 80, respectively).

As a result of the extension of the pilot test to the determination of educational and occupational mobility, it is evident that; (1) determining educational and occupational mobility by asking individuals is possible, and (2) in the interests of efficiency, it may be more reasonable to select a sample of individuals stratified by occupational category rather than taking a simple random sample of all persons in a given geographic area. Using this latter procedure, it would be possible and economically feasible to estimate educational and occupational mobility by use of a relatively small sample for an area as large as a region or state.

Table 29

OCCUPATION TO OCCUPATION MOBILITY
FOR THE SAMPLE

Category in 1970	Total in 1970	Category in 1971: Employed (full time) Total	Professional	Managers	Sales	Clerical	Craftsmen	Operatives	Farmers & Farm Laborers	Service	Laborers	Other Categories
Employed (full time)	677	637	78	106	51	91	76	67	106	31	31	40
Professional	86	81	77	1	0	2	0	0	0	1	0	5
Managers	105	105	0	102	3	0	0	0	0	0	0	1
Sales	53	51	0	2	47	1	0	0	1	0	0	2
Clerical	97	88	0	1	0	87	0	0	0	0	0	9
Craftsmen	80	76	0	0	0	0	73	2	1	0	0	4
Operatives	73	67	0	0	0	0	3	64	0	0	0	6
Farmers & Farm Laborers	107	104	0	0	0	0	0	0	104	0	0	3
Service	37	32	0	0	0	1	0	1	0	30	0	5
Laborers	38	33	1	0	1	0	0	0	0	0	31	5
Other Sources	899	57	5	3	6	16	9	6	4	6	2	842
Total in 1971	1576	694	83	109	57	107	85	73	110	37	33	882

Geographic Mobility

Another extension of determination of individual demand for vocational education was to determine if geographic mobility of individuals in a given area could be estimated. For this purpose, the respondents were asked to list their addresses in 1970 and 1971. Table 30 shows the resulting information. As for previous mobility tables, the rows represent locations in 1970 and the columns location in 1971. By linking the occupation of those that moved with the place where they moved (in or out of geographic area) it is possible to estimate occupational demand and supply provided by individuals moving out of and into the area, respectively.

From the pilot test information it was concluded that: (1) The method provides an estimate of those who have moved into the area but not those who moved out (this could be corrected by finding out who lived in a household at a specific time and if they have left, obtaining a forwarding address); (2) the use of address to specify location in a specific geographic area is not precise enough--residents of a particular geographic area may have addresses from communities outside the area (i.e. some residents of Steele County had addresses using cities outside the County); and (3) again from the point of efficiency, it is apparent that a stratified sample on the basis of location would be economically more feasible than a simple random sample of the individuals in the area.

Table 30

GEOGRAPHIC MOBILITY

Address in 1970	Address in 1971						
	Total	Ellendale	Medford	Owatonna	Blooming Prairie	Other Com. in Minn.	All Other States
Ellendale	78	77	0	1	0	0	0
Medford	71	0	71	0	0	0	0
Owatonna	1,124	0	1	1,103	0	17	3
Blooming Prairie	206	2	0	1	197	5	1
Other Communities in Minnesota	87	7	2	18	6	53	0
All Other States	16	0	1	12	2	0	1
Total	1,582	86	75	1,135	205	76	5

SUMMARY

The analyses of the data collected during the pilot test is directed at answering questions concerning the selection of a procedure for the determination of individual demand for vocational education. Specifically, it was directed at assessing: (1) effectiveness and efficiency of various methods of collecting the data, (2) representativeness of the sample, (3) validity and reliability of the indicators of individual demand, and (4) feasibility of extending the data collection to that necessary to estimate school, job, and geographic mobility.

As stated above, both the effectiveness and efficiency of various data collection techniques were analyzed. Effectiveness was defined in terms of percent responses, while efficiency was estimated by the actual cost of obtaining a response by a particular method. The effectiveness of the methods varied from a 16 to an 83 percent response rate. Personal interview at the household yielded the greatest effectiveness. Surprisingly, the use of incentives resulted in less effectiveness than the same procedures without an incentive. The use of a mailed questionnaire with telephone follow-up substantially increased effectiveness over a procedure of just a mailed questionnaire. There was no meaningful difference in effectiveness of the methods in rural versus urban areas.

Efficiency was reported in terms of dollars per delivered and per completed questionnaire. In terms of completed questionnaires, the use of incentives was less efficient than the same procedures without incentives. The least efficient methods in terms of completed questionnaires were those utilizing personal interviews. For reference in making decisions in future determination of people needs for vocational education, the time and cost associated with the activities needed to select the sample and collect the data was specified using the experience gained in this study.

Using this information, it appears that, from the point of efficiency, the method involving third class mailed questionnaire, first class mailed questionnaire with post letter and first class mailed questionnaire with telephone follow-up were most efficient. However, the latter method was much more effective. Perhaps the use of a colorful stamp surpassed the expected differences in response between methods using third versus first class mail. However, using third class mail will mean that undelivered questionnaires will not be returned. Considering these factors, a combination of first class mailed questionnaire, post letter, and telephone follow-up may be most effective and efficient.

The representativeness of the sample was ascertained by first comparing the respondents of each data collection method to see if they could be combined into one group. Finding no significant difference based on age and sex, all respondents were grouped. To more specifically determine if the respondents

from data collection methods with lower rates of return were representative of the respondents from those with high rates of return, the respondents from the method with the highest return was compared to all other respondents. No significant difference was found on the characteristics of age, sex, grade in school completed, hours worked, and occupation and industry, if working, and demand for vocational education. One last check on representativeness involved a comparison of all respondents in the sample to the population in the geographic area. The comparisons were made on the basis of age, sex, grade in school completed, labor force status, and occupational and industry, if working. Although there were significant differences between the sample and the population within several of these characteristics, it was concluded that these differences were not of sufficient size to term the sample unrepresentative considering the use to which the data from the sample was to be put. On the basis of these comparisons it was concluded that the sample was sufficiently representative of the population for purposes of the study and that therefore a simple multiplier could be used in generalizing a sample statistic to a population estimate.

Looking more specifically at the results of data analysis concerning demand for vocational education, it was concluded that the data collection form provided reliable estimates of demand. Reliability was checked by comparing the demand estimates across different data collection methods using the questionnaire. The validity of the demand estimates was analyzed by comparing estimated enrollment in vocational education programs with actual enrollment in a specific school district. The conclusion was that respondents were not able to correctly identify if they were enrolled in a vocational education program using the data collection questionnaire. For this reason, the remainder of data analyses on demand for vocational education was limited to information about those who wanted to enroll in a vocational education program but didn't. For these latter analyses, it is assumed that the information on programs in which respondents wanted to enroll does in fact represent their demand in terms of their perception of vocational education (as defined on the questionnaire).

To illustrate how individual demand for vocational education can be specified and communicated for use in planning programs, the structure for individual demand as formulated in Chapter I was used. Specification was in terms of: (1) size of population who may demand vocational education, (2) size of population who wanted to enroll in vocational education but didn't, (3) place of sponsorship desired, and (4) needs of the population who wanted to enroll in vocational education but didn't.

The last question of interest in the data analyses was the feasibility of the data in determining occupational, educational, and geographic mobility. In case of educational and occupational mobility, an estimate was possible but it was concluded that a more efficient means of collecting data would be through a stratified sample rather than a random sample. The above conclusion is also true for geographic mobility, with the addition that the use of address is not specific enough to identify location when studying a small area such as a county.

Based on the analyses of data from the pilot test of determination of individual demand for vocational education and the resulting conclusions, a set of recommendations for future individual demand determinations was made. These recommendations are specified in the next chapter in the form of a recommended set of procedures to determine people needs for vocational education.

Chapter IV

DETERMINATION OF INDIVIDUAL DEMAND: GUIDELINES FOR ASSESSMENT

The principal purpose of this study was not to gather vocational education needs data about the people of Steele County, but rather to develop alternative procedures for determining need and to test those procedures through a pilot test in a selected geographic area.

Thus, the results of the test can best be described as a recommended method that can be followed by local education agencies or by state departments of education to collect the kinds of data about people needs that are appropriate for program planning in vocational education. This section might be used as a handbook or guide to conduct a study of people needs by simply following the nine steps suggested by the following key questions:

1. Who should be asked about vocational education needs?

2. How can you secure a representative sample if data cannot be collected from everyone?

3. What kind of questions are appropriate to ask?

4. What methods are most appropriate for collecting the data?

5. What percent response can be anticipated from those surveyed?

6. What is the likelihood that the data collected are representative of the population surveyed?

7. How can the data be assembled to communicate to others the vocational education needs of the community?

8. How can the cost of the study be estimated?

9. What steps should be taken to assure that the study is administered in a well organized manner?

WHO TO ASK

Since vocational education is defined as appropriate for those who can benefit from participation in vocational education programs, it is important that a study not be too narrowly restricted by age or other biographic descriptors. Thus, a study might well include all persons, both youth and adults, for whom vocational education is intended. If used in planning programs for specific age groups or target populations, the sub-sets of the total data base may be extracted to provide meaningful planning data. Collecting data on the whole population provides a better description of the total vocational education needs and allows the planners to keep the program plans for a subset of the population in perspective with the needs of all persons of the population.

Since vocational education is generally available only to persons 13 years of age or over, the population may be defined as "all persons living in the prescribed geographic area who at some specified date are 13 years of age or over". The population to which the data and subsequent analysis apply can be modified by adjustment of the description of the inclusive ages of the population depending on the purpose for which the data are intended.

HOW TO SAMPLE

While there are several methods of sampling that might provide good representation of the population, a method that appears to be least costly in both time and money is one based on geographic location of households. It involves a random sampling of sampling units consisting of about six households each. The major advantages of this method of sampling are: (1) much of the work in identifying the sample can be done in an office by secretarial help; (2) everyone must live somewhere and thus the "household" allows potential contact with everyone in the population; and (3) the general procedure has been documented and used successfully for other purposes for some time. The process is described in detail in Chapter II of this report and consists of the following steps:

1. Using a census based map of the area to be sampled, list the enumeration districts in descending order by population size.

2. Estimate the number of dwellings in each enumeration district.

3. Compute the number of sample segments in each enumeration district by dividing the number of dwellings by six.

4. Compute the cumulative number of sample segments in the array of enumeration districts.

5. Determine the proportion of the population to be sampled (i.e. 1 in 5).

6. Draw a random number between 1 and the upper limit of your sampling ratio (i.e. 1:5, draw a number between 1 and 5).

7. Determine the number of sample segments to be drawn from each enumeration district by starting with the random number (selected in step 6) and adding the upper limit of the ratio to each successive draw until the cumulative number of sample segments in the enumeration districts has been reached.

8. Locate the households in each enumeration district.

9. Divide the enumeration district into sample segments; number each sample segment.

10. Draw random numbers equal to the number of sample segments to be used from the enumeration district. The random numbers should be between 1 and the total number of segments in the enumeration district.

11. List names and addresses of households in the sample segments selected in step nine. This list now constitutes the sample for the study.

This sampling procedure is most appropriate if you want to sample adults in a particular geographic area. If you want information from only individuals in the last years of elementary school or in high school, it may be more appropriate to collect information from everyone meeting these criteria by administering the questionnaire in school.

Another important aspect of the sampling question is to determine the sample size needed. The solution to this problem is based on many factors, of which only a few of the most important will be dealt with here.[1] In discussing these factors, it is assumed that the estimate being made is the proportion of persons in a particular category of the population (i.e. the proportion of persons in the population interested in enrolling in an auto mechanics program). It is also assumed that the sampling method is a simple random sample.

With these assumptions in mind, the factors important to the sampling question considered here are: (1) desired accuracy in the estimate, (2) expected proportion of persons in a category before doing the study, (3) resources available to conduct the sample, and (4) effect of population size.

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[1] For more detailed study, there are several books and publications which deal with this topic. Some good examples are:

Walker, Helen M. and Joseph Lev. Statistical Inference, Holt, Rinehart and Winston: New York, 1953.

Slonim, Morris James. Sampling, Simon and Schuster: New York, 1967.

Kish, Leslie. Survey Sampling, John Wiley and Sons, Inc.: New York, 1965.

With unlimited resources, one can get 100 percent accuracy by making the sample the same size as the population. However, unlimited resources are not the usual case so this alternative can be ignored except when the population is relatively small and easily accessible (i.e. all students in a particular school). When resources are limited and the population large, a sample of some size less than the population must be considered.

With some resource flexibility, it is logical to start by deciding upon the accuracy necessary to result in valid information for the purposes intended. This approach brings into play the trade-off between accuracy of information and resources required to obtain the information. Generally, the more accurate one wants to be, the larger the sample required, and therefore the higher the costs.

As an example, the population size for the geographic area studied in this project was 20,000 persons. If one is concerned about estimating the proportion of persons interested in an auto mechanics program, and if existing information leads one to believe that approximately one percent of the population may be interested, then the sample size required for various degrees of accuracy are as follows:

Allowable Error[a]	Sample Size
200	165
100	632
50	2405
10	15128

[a]Allowable error should be interpreted to mean that the estimated population value obtained from the sample plus or minus the number listed in this column would include the true population value in 90 out of 100 samples.

This table states that if one wants his estimate of number of persons interested in auto mechanics to be within 100 persons of the actual number interested in the population in 90 samples out of 100, then he must randomly sample 632 persons. If the estimate is to be within 10 persons, he must sample 15,128 persons. As can be seen, as desired accuracy increases, sample size must increase, other things remaining the same.

In the above example, it was estimated, before sampling, that one percent of the population was interested in the auto mechanics program. The size of the sample required to maintain a certain level of allowable error is dependent upon the size of this prior estimate. Sample size required to insure a constant accuracy increases as this prior estimate approaches 50 percent.

Another relationship which is important to consider in sampling is that sample size is not very dependent on population size when the population is

relatively large. For example, if we assume from our previous example that one percent of the population is interested in auto mechanics and we allow an error of 50 persons in 90 samples out of 100, then the sample size required for various size populations is as follows:

Population Size	Sample Size Required	Percent Sample of Population
200	186	93%
500	423	85%
1000	733	73%
2000	1156	58%
5000	1771	35%
10000	2152	22%
20000	2405	12%
50000	2599	5%
100000	2669	3%

Note that the sample size increases very little after the population reaches 10,000 under the pre-set condition. This relationship is important to keep in mind when estimating cost of information collection for a large and small population - the sample size required to insure a constant level of accuracy does not increase in direct proportion to increased population size.

The problem of sample size has not been answered for a particular situation. Only some of the major factors to consider and their relationship to sample size have been discussed. The conclusion is that sample size depends on several characteristics of a situation in which the sample is to be made (i.e. resources available, desired accuracy, population size). Sample size can only be specific after these characteristics are made explicit.

QUESTIONS TO ASK

If the principle concern is to collect data about the needs of people for vocational education, the following questions are most basic. The questionnaire should be modified to meet local needs and the specific purposes of the study being conducted.

I. QUESTIONS ABOUT YOU AND THE HOUSEHOLD IN WHICH YOU LIVE

1. Name_____

2. Address_____
City, State, and School District

3. What was the approximate combined total income of all members of this household this past year? (Check one)

(1) ___under $3000 (2) ___$3000 to 4,999 (3) ___$5000 to 7,999

(4) ___$8000 or more

4. How many people of all ages (including yourself) live in this household?

5. Your age_____ 6. Sex: (1) ___Male (2) ___Female

7. Marital status (Check one): (1) ___Single (2) ___Married (3) ___Other

8. How many grades of school have you completed? (Check one)

(1) ___less than 6 (2) ___7 (3) ___8 (4) ___9 (5) ___10

(6) ___11 (7) ___12 (8) ___13 (9) ___14 or more

9. Check any one of the following if it describes your physical condition:

___Deaf
___Hard of hearing (need hearing aid)
___Speech problem (stutter, etc.)
___Blind (20/200 or less in better eye after correction)
___Partially sighted (20/200 to 20/70 in better eye after correction)
___Physically impaired (crippled, heart condition, etc.)

II. QUESTIONS ABOUT YOUR EMPLOYMENT

10. On the average, how many hours did you work per week (including all jobs) during (month, year)? (Work is defined as an activity for which you are paid money, or receive some other kind of pay.) Check one:

(1) ___None - not working (2) ___Less than 20 hours/week

(3) ___20-35 hours/week (4) ___More than 35 hours/week

If you checked (4) in Question 10 skip to Question 12. If you checked Questions (1), (2), or (3) in Question 10, go to Question 11.

11. Please indicate WHY you worked 35 or fewer hours/week or did not have a wage paying job. (Check those that apply)

___In school--If you check this one, then indicate:
___Grade 8 or below
___Grade 9-12
___Post secondary vocationa
___Junior college
___College or university
___On-the-job training program with an industry
___Apprenticeship training
___Other (describe)_____

___In military service
___Ill
___Confined to an institution
___Retired
___Could not find work
___Did not want more wage paying work
(If you check this one, WHY?)
___Homemaker
___Other (describe)_____
___Other reason (describe)_____

If you checked (1) in Question 10, skip to Question 17. If you checked (2), (3), or (4) in Question 10, answer Questions 12-16.

12. How many employers did you have? _____

13. Who was your main (or only) employer in (month, year) ? (Give name of company, business or organization.)

_____

14. In what city and state was your main (or only) employer located?

City: _____ State: _____

15. What kind of business or industry was this? (For example: furniture manufacturer, retail grocery store, banking, soil conservation service, farming.)

_____

16. What kind of work were you doing at this business or industry during (month, year)? (For example: manager, typist, farmer)

_____

III. QUESTIONS ABOUT YOUR NEED FOR VOCATIONAL EDUCATION:

This section asks you to tell about your need for vocational education. VOCATIONAL EDUCATION means a training course or educational program that would prepare you for a new job or better prepares you for the job you now have. Vocational education programs are found in public schools, private schools, and industry. Vocational education does not include preparation for jobs requiring a college degree or training for leisure or hobby activities.

17. Between (month, year) and (month, year) were you: (Check those that apply)

(1) ___ ENROLLED in one or more vocational education courses similar to those suggested in the following list (if you check this one, answer Questions 18-23).

AGRICULTURAL - For example; farm mechanics, farm business management, agricultural chemicals, feeds, horticulture

DISTRIBUTIVE - For example; advertising finance and credit, merchandising, transportation

HEALTH - For example; dental assistant, nursing, medical laboratory technician

HOME ECONOMICS - For example; child care, clothing, family health, institutional cooking, consumer education

OFFICE - For example; accounting, cashier, filing clerk, typist, secretary

TECHNICAL - For example; communication technician, refrigeration specialist, chemical technician

TRADE AND INDUSTRIAL - For example; carpentry, electrician, welder, machinist, cosmetologist, radio repairman

(2) ___ WANTED TO ENROLL in a vocational education course, but didn't. (If you check this one, answer Questions 24-31)

(3) ___ DID NOT WANT TO ENROLL in any vocational education course. (If you check this one, you need not answer any more questions. Thank you.)

V. QUESTIONS ABOUT A COURSE OR COURSES IN VOCATIONAL EDUCATION IN WHICH YOU WERE ENROLLED:

Answer Questions 18-23 only if you **WERE** ENROLLED in a vocational education course between (month, year) and (month, year). If you were enrolled in more than two courses, answer the following questions for the two longest courses:

18. What was the specific title of the course or courses in which you were enrolled? (For example: farm power and machinery, auto-body repair, legal secretary, institutional cooking)

Course 1:_____

Course 2:_____

19. Where were you enrolled for the course or courses you took in vocational education? (Check one for each course)

	Course 1	Course 2	
(1)	_____	_____	Public school--If you check this one, was it:
(2)	_____	_____	Private school
(3)	_____	_____	On-the-job training with industry
(4)	_____	_____	Apprenticeship program
(5)	_____	_____	Other (describe): _____

Course 1	Course 2	
_____	_____	High School
_____	_____	Post secondary vocational school
_____	_____	Other (describe): _____

20. How many hours per week were you enrolled in vocational education courses?

	Course 1	Course 2	
(1)	____	____	3 hours per week or less
(2)	____	____	4-19 hours per week
(3)	____	____	20 hours per week or more

21. How many weeks were you enrolled in vocational education courses? (Check one for each course)

	Course 1	Course 2	
(1)	____	____	10 weeks or less
(2)	____	____	11-23 weeks
(3)	____	____	24 weeks or more

22. What was your reason for enrolling in a vocational education course or courses? (Check the ONE most accurate reason for each course)

	Course 1	Course 2	
(1)	____	____	To get an introduction to vocational education
(2)	____	____	To obtain skills in arithmetic, reading or writing
(3)	____	____	To get training for my first full-time job
(4)	____	____	To improve my ability at my present job
(5)	____	____	To improve to get promoted
(6)	____	____	To train for a new job, not related to present or past job
(7)	____	____	Other (describe):_____

23. Would you be interested in taking more vocational education courses in the future?

(1) ____NO

(2) ____YES--If you check this, please describe what specific courses you would be interested in taking:

1._____

2._____

If you check only (1) in Question 17, you need not answer any more questions. Thank you. If you checked both (1) and (2) in Question 17, then answer Questions 24-31.

VI. QUESTIONS ABOUT A COURSE IN VOCATIONAL EDUCATION IN WHICH YOU WISHED TO ENROLL BUT DIDN'T:

Answer Questions 24-31 ONLY IF YOU WISHED TO ENROLL in a vocational education course between (month, year) and (month, year), BUT DID NOT ENROLL.

24. In what general type of vocational education course did you want to enroll?

(1) ___AGRICULTURAL (For example; farm mechanics, farm business management, agricultural chemicals, feeds, horticulture)

(2) ___DISTRIBUTIVE (For example; advertising, finance and credit, merchandising, transportation)

(3) ___HEALTH (For example; dental assistant, nursing, medical laboratory technician)

(4) ___HOME ECONOMICS (For example; child care, clothing, family health, institutional cooking, consumer education)

(5) ___OFFICE (For example; accounting, cashiers, filing clerk, typist, secretary)

(6) ___TECHNICAL (For example; communication technician, refrigeration specialist, chemical technician)

(7) ___TRADE AND INDUSTRIAL (For example; carpentry, electrician, welder, machinist, cosmetologist, radio repairman)

25. What was the specific title of the course in which you wanted to enroll? (For example; farm power and machinery, auto body repair, legal secretary, institutional cooking)

_____

26. Where would you have wanted to enroll? (Check one)

(1) ___ Public school--If you check this one, was it:
  (1) ___ High school
  (2) ___ Post secondary vocational school
  (3) ___ Other (describe): _____

(2) ___ Private school

(3) ___ On-the-job training with

(4) ___ Apprenticeship

(5) ___ Other (describe):_____

(6) ___ Do not know

27. When would you have wanted to attend the course?

(1) ___ Days (Monday-Friday)

(2) ___ Evenings (Monday-Friday)

(3) ___ Weekends

28. Why did you want to enroll in the vocational education course that you checked in Question 24? (Check the ONE most accurate reason):

(1) ___ To get an introduction to vocational education

(2) ___ To obtain basic skills in arithmetic, reading and writing

(3) ___ To get training for my first full-time job

(4) ___ To improve my ability at my present job

(5) ___ To improve to get promoted

(6) ___ To train for a new job, not related to present or past job

(7) ___ Other (describe):_____

29. Why did you not enroll? (Check those that apply)

(1) ___ Course not available in local area

(2) ___ Course not available at convenient time

(3) ___ Could not meet admission requirements

(4) ___ Costs of attending were too high

(5) ___ Present job did not allow time

(6) ___ Family obligations did not allow time

(7) ___ Other (describe):_____

30. Are you interested in taking vocational education courses in the future?

(1) ___ NO

(2) ___ YES--If you are interested, please describe what specific courses you would be interested in taking:

1. _____

2. _____

THANK YOU.

In using this questionnaire, one of the weaknesses that was apparent during the pilot test was that respondents did not seem to be able to identify the type of vocational program in which they were enrolled (i.e. agriculture, distributive, etc.). This weakness may be alleviated when designing the questionnaire for a particular area by specifically listing names of vocational courses known to be offered in the area. Also, many respondents indicated "other reasons" as the reason they did not enroll in a vocational education course which they wanted. For this reason, additional specific reasons should be added which may be relevant in a given geographic area.

HOW TO ASK

The researcher should first determine if he is concerned most about effectiveness (a high rate or return) or efficiency (low cost per return). He can then choose a method of collecting data that best meets the criterion established.

If effectiveness is the primary consideration, the personal interview is most desirable since all of the sample can be contacted, and some data collected even from those who choose not to grant an interview.

The most efficient method is to use a mailed questionnaire, third class postage, with a follow-up reminder shortly after the questionnaire is mailed. The mail procedure must, however, use all of the strategies designed to get a good response (i.e. personal address, neatly addressed envelope, colorful stamps, enclosed self addressed envelope for return of completed questionnaire).

The method which results in both relatively high effectiveness and high efficiency combines a mailed questionnaire with a telephone follow-up.

RESPONSE TO EXPECT

The proportion of persons who respond to the questionnaire will depend on how the questionnaire is administered. Mailed questionnaires produce the lowest response (about 35%). As the degree of personal contact increases, the response rate also increases. Following a mailed questionnaire with a telephone call can raise the rate of response to over 60 percent. The personal interview provides the best response rate with about 85 percent of those interviewed providing information.

Knowing the rate of response to be expected from each method is important in deciding the size sample that must be drawn and the data collection method to be used. If a response rate of 75 to 80 percent is not attained, procedures such as those used in this report should be used to validate the representativeness of the sample. A common alternative procedure to that used in this report

is to sample those who did not respond and determine if their responses are different from those who originally responded. Needless to say, the move to the step of data analysis and summary will be much quicker if a representative sample can be obtained on the first sampling.

HOW REPRESENTATIVE

If the sampling procedure outlined in this report is followed, there are several assurances that the data will be representative. The sampling plans assure a random unbiased sample of households. Since everyone lives someplace, this method is superior to randomly choosing persons from telephone directories or other lists that may not contain all residents.

If data is collected from a well defined geographic area, there are other forms of data to which the sample information can be compared. Standard items such as age, marital status, sex, and occupation can be checked against data reported in the population census, county business patterns, school enrollment records and other forms of public record. In the pilot study reported in this summary, sample data was found to be reasonably representative of the population when statistical comparisons were made with published information about the population.

In the case of mailed questionnaires, an interview follow-up can be made of those who failed to respond to determine if the non-respondents are similar in characteristics to those who responded.

ASSEMBLING DATA

The first consideration in determining the way in which data are to be assembled is the nature of the group or groups to whom the result is to be communicated; the more knowledgeable the target group, the more sophisticated the presentation can be. [For example, the data about the household might be presented in figure form as in Figure 9. When data is displayed in this manner, the reader gets a visual impression of the distribution of the population by age even though he may not remember the exact percentage distribution in each age category.]

Some facts about the education needs of the population can also be expressed very well in graphic form. Figure 10 illustrates the magnitude of demand for vocational education by the employment-school membership of the respondents. While such information could as easily have been displayed in table form, the graphic display has greater visual impact. If, for example, the

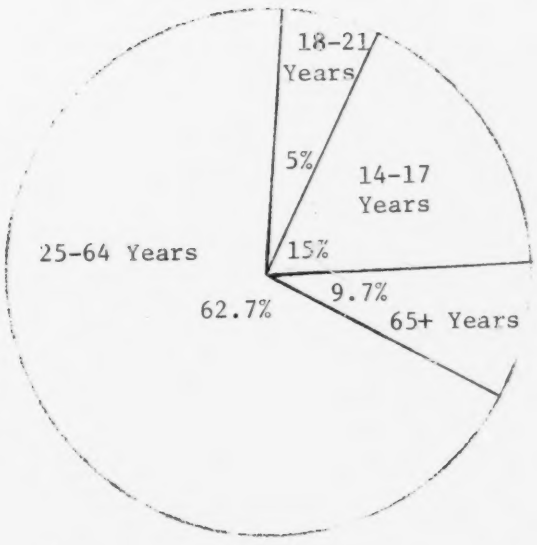

Figure 9

AGE DISTRIBUTION OF COUNTY RESIDENTS
STEELE COUNTY - 1972

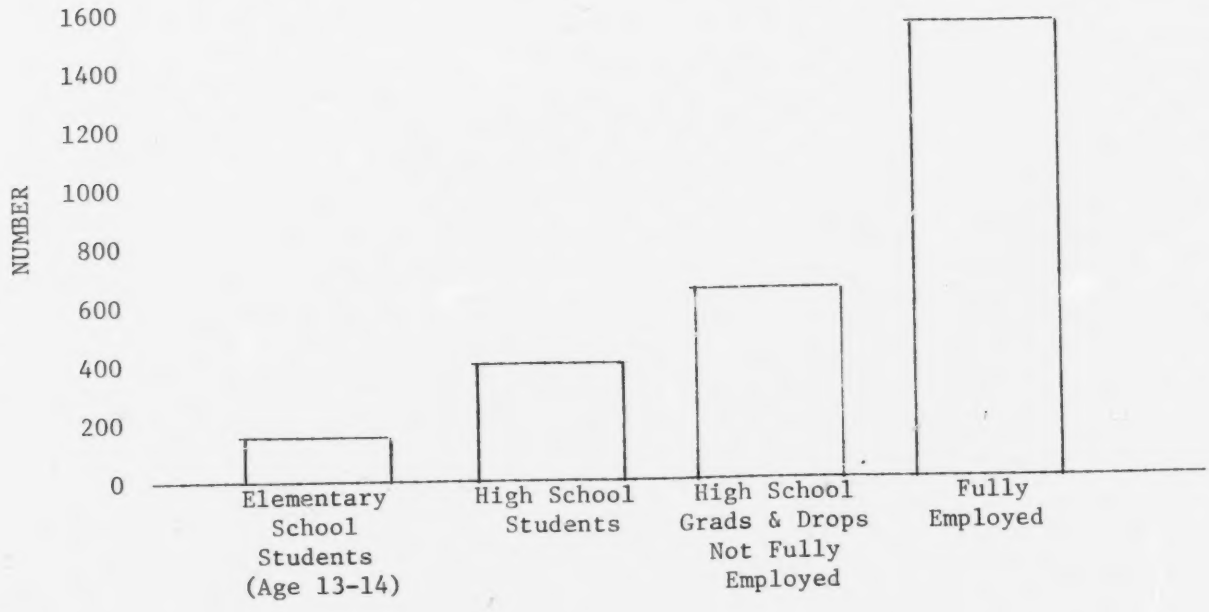

Figure 10

NUMBER OF PEOPLE WHO WANTED TO ENROLL BUT DIDN'T

display was to be used to illustrate the point that the greatest demand for vocational education was from those out of school, the graphic display would be more desirable. If, on the other hand, the concern was with the absolute number of people involved to allow some projections of enrollments, the precision offered by use of tables data might be more important.

Where precise data need to be communicated, the table is an appropriate display method. In Table 31, for example, the reader can tell the exact number of persons in the sample who have expressed an interest in one of the vocational fields and can further examine the projected number that would be found in the entire population.

Figure 31

PROJECTION OF NUMBER OF FULLY EMPLOYED WHO WANTED TO ENROLL BUT DIDN'T IN VARIOUS VOCATIONAL PROGRAMS

Vocational Program Of Interest	Number In Sample	Estimated Number In Population*
Agriculture	9	113
Distributive	14	176
Health	4	50
Home Economics	5	63
Office	24	302
Technical	8	101
Trade and Industry	52	655
Total	116	1460

*Because the sample is representative of the population, the estimate was accomplished by multiplying sample values by 12.6 (the ratio of sample to population).

ADMINISTRATION

If the needs study is to run smoothly, it must be planned and directed. After answering questions posed in the previous key questions, a detailed plan of operation should be formulated. The plan should define activities to be undertaken, when they should start, deadlines for completion, and person responsible for carrying out the activity. A portion of the plan for the pilot test reported in previous chapters is shown as Exhibit 8.

Exhibit 8

PLAN OF ACTIVITIES

Date	Activity	Persons Responsible
Dec. 29-31	1. Get names and addresses of contact persons	
	Superintendents of Schools Owatonna Blooming Prairie Medford Ellendale	Copa, Thomas
	Vocational School Directors	
	Vocational Teachers	
	Organizations PTA J.C. Chamber of Commerce N.F.O. Farmers Union Farm Bureau	Thomas
	News Media Radio Newspaper	Persons
	Government Mayors County Commissioners	Copa, Thomas
	2. Write contact letters	Persons
	3. Write first news release	Thomas
	4. Secure platbook and maps	Thomas
January 3-7	1. Send contact letters	Copa
	2. Start identification of sample	Thomas
	3. Send first news release	Thomas
	4. Review questionnaire - get opinion of keypunch & programmer	Copa

	5. Write cover letters per method	Persons
	6. Contact source of incentives	Persons
	7. Contact interviewers	Thomas
January 10-14		
	1. Visit superintendents of schools	Copa, Thomas
	2. Prepare presentation on project for organizations	Copa
	3. Get post office box in Owatonna	Thomas
	4. Order address stamp	Copa
	5. Questionnaire and cover letters to printer	Copa
	6. Write second news release	Persons
	7. Reserve motel rooms	Thomas
	8. Write pre-letter	Persons
January 17-21		
	1. Visit organizations at request	Copa, Thomas
	2. Complete sample identification	Thomas
	3. Send second news release	Thomas
	4. Questionnaire back from printers	Copa
	5. Copies of pre-letters to printer	Copa
January 24-28		
	1. Complete visitation of organizations	Copa, Thomas
	2. Addressing and stuffing of questionnaires began	Secretary

The plan will serve to keep the study on schedule and make it a more manageable task. The time estimates for various activities as presented earlier for the pilot test (see Chapter III) may be helpful in setting a time schedule. A checklist which may be helpful in formulating the plan follows:

1. Select a project director who will be responsible for the planning and operation of the study.

2. Inform the public about the when, where, and why of the study. Schedule releases for local radio stations and newspapers and meet with community organizations (i.e. PTA, farm organizations, Chamber of Commerce).

3. Communicate the purpose of the study to key individuals in the community (i.e. school board, government officials, teachers, advisory committees).

4. Identify individuals and obtain directories that will be helpful in securing names and addresses.

5. Secure detailed recent maps of the geographic area to be studied. City maps should show all streets and blocks.

6. Contact local police department and inform them of purpose and schedule for the study. Obtain any necessary permits if interviews are to be conducted in collecting the information.

7. Determine how long it will take to get questionnaires printed; set deadlines on questionnaire development so they are printed in time to meet the schedule of data collection which has been set.

8. Organize office personnel and equipment to carry out sample selection, questionnaire dissemination and collection, data analyses and report writing.

ESTIMATING COST

Since salary rates, fringe benefits and other costs will vary, only some general guidelines can be suggested. The form shown as Exhibit 7 will aid in categorizing the budget so that no important items are overlooked when estimating costs. Adequate time must be allowed for completing the report of the needs survey and provisions for dissemination of the report included in the budget estimate. Refer to the sections on sample selection and questionnaire effectiveness and efficiency for estimates of costs and time used in collecting data.

Exhibit 7

BUDGET FORM

Project Director
School
Starting Date
Ending Date

I. Direct Costs

Personnel Salaries
- Professional
- Support

Employee Benefits

Travel

Supplies and Materials

Services
- Sample selection
- Questionnaire development & printing
- Questionnaire dissemination
- Data coding
- Data analysis

Final Report Production

Equipment

Other Direct

II. Indirect Costs

III. Total Cost

SUMMARY

The first chapter of this report developed a rationale for structuring the individual demand, more commonly called people needs, for vocational education. Information was structured in such a way as to allow specification and communication of this demand for the purpose of planning vocational education programs. Based on an examination of the structure, the specific information necessary to complete it was derived. Before numerous or large scale attempts were made to determine people needs for vocational education, it was recommended that alternative data collection procedures be developed and tested on a pilot basis.

The design for a pilot test of this nature was specified in Chapter II. The design entailed identification of the area in which to conduct the test, who was to be studied, how a sample was to be drawn, what questions were to be asked, and how the questions were to be asked. The result was a set of alternative procedures to be pilot tested. The main variation in procedures was in how the questions were asked.

Results of the pilot test were presented in the third chapter. These results allowed conclusions about the validity and reliability of the data as well as the effectiveness, efficiency and workability of the alternative procedures.

On the basis of the conclusions from the pilot test, a set of recommendations were detailed in this chapter. These recommendations are in the form of a guide for use by local education agencies or state departments of education in conducting a determination of individual demand for vocational education. As a guide, the recommendations were not presumed to apply to all situations for individual demand determination. Rather, they should provide general answers to specific questions which the directors of similar studies will raise. It is assumed the procedures selected for needs determination in a specific situation will, indeed, be specific to the situations and decisions to be made.

APPENDIX 1

DATA COLLECTION QUESTIONNAIRE

[1-11] [0][1][ ][ ] [ ][ ][ ][ ]

VOCATIONAL EDUCATION NEEDS QUESTIONNAIRE

I. QUESTIONS ABOUT YOUR HOUSEHOLD:

As of **October, 1971** As of **October, 1970**

1. Address _____ _____
City and State City and State

[12-21] [ ][ ][ ][ ] [ ][ ][ ][ ]

Answer the following questions as of OCTOBER, **1970**.

2. What was the approximate combined total income of all members of this household this past year (check one):

[22] (1) ____ under $3000 (2) ____ $3000 to 4,999 (3) ____ $5,000 to 7,999 (4) ____ $8,000 or more

[23-24] 3. How many people of all ages (including yourself) lived in this household: ____

[25-26] 4. Your age ____ 5. Sex: (1) ____ Male (2) ____ Female [27]

[28] 6. Marital status (check one): (1) ____ Single (2) ____ Married (3) ____ Other

7. How many grades of school had you completed (check one):

[29] (1) ____ less than 6 (3) ____ 8 (5) ____ 10 (7) ____ 12 (9) ____ 14 or more
(2) ____ 7 (4) ____ 9 (6) ____ 11 (8) ____ 13

8. Check any one of the following if it described your physical condition:

[30] ____ Deaf

[31] ____ Hard of hearing (need hearing aid)

[32] ____ Speech problem (stutter, etc.)

[33] ____ Blind (20/200 or less in better eye after correction)

[34] ____ Partially sighted (20/200 to 20/70 in better eye after correction)

[35] ____ Physically impaired (crippled, heart condition, etc.)

II. QUESTIONS ABOUT YOUR EMPLOYMENT IN OCTOBER, 1970:

The next section deals with your employment situation as of **October, 1970** (one year from this past October). Please answer Questions 9 through 16 in terms of your employment at that time.

9. On the average, how many hours did you work per week (including all jobs) during October of *1970*? (Work is defined as an activity for which you are paid money, or receive some other kind of pay) Check one:

[36] (1) ____ None—not working (3) ____ 20-35 hours/week
(2) ____ Less than 20 hours/week (4) ____ More than 35 hours/week

If you checked (4) in Question 9, skip to Question 11. If you checked (1), (2), or (3) in Question 9, go to Question 10.

GO TO PAGE 2

10. Please indicate *WHY* you worked 35 or fewer hours/week or did not have a wage paying job. (Check those that apply):

[37] ___ In school (if you check this one, then indicate): ⇨
- ___ Grade 8 or below [47]
- ___ Grade 9-12 [48]
- ___ Post secondary vocational [49]
- ___ Junior college [50]
- ___ College or university [51]
- ___ On-the-job training program with an industry [52]
- ___ Apprenticeship training [53]
- ___ Other (describe) ___ [54]

[38] ___ In military service

[39] ___ Ill

[40] ___ Confined to an institution

[41] ___ Retired

[42] ___ Could not find work

[43] ___ Did not want more wage paying work (If you check this one, WHY?)

[44] ___ Homemaker

[45] ___ Other (describe) ___

[46] ___ Other reason (describe) ___

If you checked (1) in Question 9, skip to Question 16. If you checked (2), (3), or (4), answer Questions 11-15.

11. How many employers did you have? ___ [55]

12. Who was your main (or only) employer in **October, 1970?** (Give name of company, business, or organization).

___

___

13. In what city and state was your main (or only) employer located? ☐☐☐☐☐ [56-60]

City: ___ State: ___

14. What kind of business or industry was this? (For example: furniture manufacturer, retail grocery store, banking, soil conservation service, farming).

___

___ ☐☐☐☐ [61-64]

15. What kind of work were you doing at this business or industry during October of 1970? (For example: manager, typist, farmer)

___

___ ☐☐☐☐☐ [65-69]

III. QUESTIONS ABOUT YOUR EMPLOYMENT IN OCTOBER, 1971:

Questions 16 through 24 should be answered as they apply to your employment situation during **OCTOBER, 1971** (this past October).

16. On the average, how many hours did you work per week during **October, 1971?** Check one:

[70]
- (1) ___ None—not working
- (2) ___ Less than 20 hours/week
- (3) ___ 21-35 hours/week
- (4) ___ More than 35 hours/week

[0|2]

[1-2] 17. If you checked (4) in Question 16, skip to Question 18. If you checked (1), (2), or (3) in Question 16, please indicate WHY you worked 35 or fewer hours/week or did not have a wage paying job. (Check
[3-11] those that apply):

[12] ____ In school (if you check this one, then indicate): ⇨
[13] ____ In military service
[14] ____ Ill
[15] ____ Confined to an institution
[16] ____ Retired
[17] ____ Could not find more work
[18] ____ Did not want more wage paying work (If you check this one, WHY?)
[19] ____ Homemaker
[20] ____ Other (describe) _____
[21] ____ Other reason (describe) _____

____ Grade 8 or below [22]
____ Grade 9-12 [23]
____ Post secondary vocational [24]
____ Junior college [25]
____ College or university [26]
____ On-the-job training program with an industry [27]
____ Apprenticeship training [28]
____ Other (describe) _____ [29]

If you checked (1) in Question 16, skip to Question 23. If you checked (2), (3), or (4) in Question 16, answer Questions 18-22.

18. How many employers did you have? _____ [30]

19. Who was your main (or only) employer in October, *1971*? (Give name of company, business, organization):

_____

20. In what city and state was your main (or only) employer located? [31-35]

City: _____ State: _____

21. What kind of business or industry is this? (For example: furniture manufacturer, retail grocery store, soil conservation service, farming):

_____ [36-39]

22. What kind of work were you doing at this business or industry during October, 1971? (For example: machinist, manager, typist, farmer):

_____ [40-44]

IV. QUESTIONS ABOUT YOUR NEED FOR VOCATIONAL EDUCATION:

This section asks you to tell about your need for vocational education. VOCATIONAL EDUCATION means a training course or educational program that would prepare you for a new job or better prepares you for the job you now have. Vocational education programs are found in public schools, private schools, and industry. Vocational education does not include preparation for jobs requiring a college degree or training for leisure or hobby activities.

23. Between OCTOBER, **1970** and OCTOBER, **1971**, were you? (Check those that apply):

[45] (1) ____ ENROLLED in one or more vocational education courses (If you check this one, answer Questions 24-30)

[46] (2) ____ WANTED TO ENROLL in a vocational education course, but didn't (If you check this one, answer Questions 31-38)

[47] (3) ____ DID NOT WANT to enroll in any vocational education course (If you check this one, you need not answer any more questions. Thank you.)

V. QUESTIONS ABOUT A COURSE OR COURSES IN VOCATIONAL EDUCATION IN WHICH YOU WERE ENROLLED:

Answer Questions 24-30 only if you WERE ENROLLED in a vocational education course between OCTOBER, *1970* AND OCTOBER, *1971*. If you were enrolled in more than two courses, answer the following questions for the two longest courses:

24. In what general *type* of vocational education course or courses were you enrolled? (Check one for each course in which you enrolled):

		Course 1	*Course 2*	
[48]	(1)	____	____	AGRICULTURAL—(For example: farm mechanics, farm business management, agricultural chemicals, feeds, horticulture)
[49]	(2)	____	____	DISTRIBUTIVE—(For example: advertising, finance and credit, merchandising, transportation)
	(3)	____	____	HEALTH—(For example: dental assistant, nursing, medical laboratory technician)
	(4)	____	____	HOME ECONOMICS—(For example: child care, clothing, family health, institutional cooking, consumer education)
	(5)	____	____	OFFICE—(For example: accounting, cashier, filing clerk, typist, secretary)
	(6)	____	____	TECHNICAL—(For example: communication technician, refrigeration specialist, chemical technician)
	(7)	____	____	TRADE AND INDUSTRIAL—(For example: carpentry, electrician, welder, machinist, cosmotologist, radio repairman)

25. What was the *specific title* of the course or courses in which you were enrolled? (For example: farm power and machinery, auto-body repair, legal secretary, institutional cooking):

Course 1: _____ ☐☐☐☐☐☐ [50-55]

Course 2: _____ ☐☐☐☐☐☐ [56-61]

26. Where were you enrolled for the course or courses you took in vocational education? (Check *one* for each course):

		Course 1	*Course 2*				
[62]	(1)	____	____	Public school (If you check this one, was it): ⇨	____	____	High school
[63]	(2)	____	____	Private school	____	____	Post secondary vocational school [64] [65]
	(3)	____	____	On-the-job training with industry	____	____	Other (describe)
	(4)	____	____	Apprenticeship program			
	(5)	____	____	Other (describe) _____			

27. How many hours per week were you enrolled in vocational education courses? (Check *one* for each course):

		Course 1	*Course 2*	
[66]	(1)	____	____	3 hours per week or less
[67]	(2)	____	____	4-19 hours per week
	(3)	____	____	20 hours per week or more

28. How many weeks were you enrolled in vocational education courses? (Check one for each course):

[1-2]
[3-11]

	Course 1	*Course 2*	
[12]	(1) ____	____	10 weeks or less
[13]	(2) ____	____	11-23 weeks
	(3) ____	____	24 weeks or more

29. What was your reason for enrolling in a vocational education course or courses? (Check the *ONE* most accurate reason for each course):

	Course 1	*Course 2*	
	(1) ____	____	To get an introduction to vocational education
	(2) ____	____	To obtain skills in arithmetic, reading, or writing
[14]	(3) ____	____	To get training for my first full-time job
	(4) ____	____	To improve my ability at my present job
[15]	(5) ____	____	To improve to get promoted
	(6) ____	____	To train for a new job, not related to present or past job
	(7) ____	____	Other (describe) ____

30. Would you be interested in taking more vocational education courses in the future?

[16]
(1) ____ No

(2) ____ Yes (If you check this, please describe what specific courses you would be interested in taking):

1. ____ [ ][ ][ ][ ][ ][ ] [17-22]
2. ____ [ ][ ][ ][ ][ ][ ] [23-28]

If you check only (1) in Question 23, you need not answer any more questions. Thank you. If you checked both (1) and (2) in Question 23, then answer Questions 31-37.

VI. QUESTIONS ABOUT A COURSE IN VOCATIONAL EDUCATION IN WHICH YOU WISHED TO ENROLL BUT DIDN'T:

Answer Questions 31-38 ONLY IF YOU WISHED TO ENROLL in a vocational education course between OCTOBER, **1970** and OCTOBER, **1971**, BUT DID NOT ENROLL.

31. In what general type of vocational education course did you want to enroll? (Check only one):

(1) ____ AGRICULTURAL—(For example: farm mechanics, farm business management, agricultural chemicals, feeds, horticulture)

(2) ____ DISTRIBUTIVE—(For example: advertising, finance and credit, merchandising, transportation)

(3) ____ HEALTH—(For example: dental assistant, nursing, medical laboratory technician)

[29] (4) ____ HOME ECONOMICS—(For example: child care, clothing, family health, institutional cooking, consumer education)

(5) ____ OFFICE—(For example: accounting, cashiers, filing clerk, typist, secretary)

(6) ____ TECHNICAL—(For example: communication technician, refrigeration specialist, chemical technician)

(7) ____ TRADE AND INDUSTRIAL—(For example: carpentry, electrician, welder, machinist, cosmotologist, radio repairman)

32. What was the *specific* title of the course in which you wanted to enroll? (For example: farm power and machinery, auto body repair, legal secretary, institutional cooking):

_____ ☐☐☐☐☐☐ [30-35]

33. Where was the program taught in which you wanted to enroll? (Check one):

(1) ___ Public school (If you check this one, was it): ⇨ (1) ___ High school

(2) ___ Private school (2) ___ Post secondary vocational school [37]

(3) ___ On-the-job training with industry (3) ___ Other (describe) _____

[36] (4) ___ Apprenticeship _____

(5) ___ Other (describe) _____

(6) ___ Do not know

34. How many hours per week would you have been taking the course? (Check one):

[38] (1) ___ 3 hours per week or less (3) ___ 20 hours per week or more

(2) ___ 4-19 hours per week or less (4) ___ Do not know

35. How long would the course have been in weeks? (Check one):

[39] (1) ___ 10 weeks or less (3) ___ 24 weeks or more

(2) ___ 11-23 weeks (4) ___ Do not know

36. Why did you want to enroll in the vocational education course that you checked in Question 31? (Check the *ONE* most accurate reason):

[40] (1) ___ To get an introduction to vocational education

(2) ___ To obtain basic skills in arithmetic, reading and writing

(3) ___ To get training for my first full-time job

(4) ___ To improve my ability at my present job

(5) ___ To improve to get promoted

(6) ___ To train for a new job, not related to present or past job

(7) ___ Other (describe) _____

37. Why did you *not* enroll? (Check those that apply):

[41] ___ Course not available in local area

[42] ___ Course not available at convenient time ___ Present job did not allow time [45]

[43] ___ Could not meet admission requirements ___ Family obligations did not allow time [46]

[44] ___ Costs of attending were too high ___ More training would not have raised my income [47]

[48] ___ Other (describe) _____

38. Are you interested in taking vocational education courses in the future?

[49] (1) ___ No

(2) ___ Yes (If you are interested, please describe what specific courses you would be interested in taking):

1. _____ ☐☐☐☐☐☐ [50-55]

2. _____ ☐☐☐☐☐☐ [56-61]

You need not answer any more questions. THANK YOU.

APPENDIX 2

SAMPLE DATA

Table 1

SAMPLE DATA ON SIZE OF POPULATION
WHO MAY DEMAND VOCATIONAL EDUCATION

	Regular	Disadvantaged	Handicapped	Total
Elementary Students	111	8	4	123
High School Students	193	20	7	220
High School Graduates and Dropouts and Not Fully Employed	359	133	63	555
Fully Employed	482	163	37	682
Total	1145	324	111	1580

Table 2

SAMPLE DATE ON SIZE OF POPULATION WHO WANTED
TO ENROLL IN VOCATIONAL EDUCATION BUT DIDN'T

	Regular	Disadvantaged	Handicapped	Total
Elementary Students	6	1	1	8
High School Students	22	6	3	31
High School Graduates and Dropouts and Not Fully Employed	38	13	4	55
Fully Employed	90	20	8	118
Total	156	40	16	212

Table 3

SAMPLE DATA ON PLACE OF SPONSORSHIP DESIRED BY POPULATION WHO WANTED TO ENROLL IN A VOCATIONAL EDUCATION PROGRAM BUT DIDN'T

	Public School Sponsored	Non Public School Sponsored	Did Not Know
Elementary Students	1	1	6
High School Students	7	2	16
High School Graduates and Dropouts Not Fully Employed	15	0	28
Fully Employed	22	13	58
Total	45	16	110

APPENDIX 3

RELIABILITY OF ESTIMATES

Reliability of Estimates

Standard error is a measure of the variation in estimates resulting from sampling rather than asking the whole population. The chances are 68 out of 100 that error due to sampling (difference between the estimate based on the sample and the true population value) is less than the standard error (i.e. if the estimate is 200 persons and the standard error is 10, then the chances are 68 out of 100 that the difference between the estimated based on the sample and the true population value is less than 10). The chances are 95 out of 100 that the difference is less than twice the standard error (20 in the previous example) and about 99 out of 100 that it is less than 2 1/2 time the standard error (25 in the previous example).

It would be too costly to prepare estimates of standard error for each of the estimates made in the following tables. Rather, a table which should be interpreted as providing an indication of the magnitude of the standard errors rather than a precise standard error for any specific item is presented. The reliability of an estimated number depends on the size of the estimate and the size of the population. In this study the population was approximately 20,000 persons. The standard error associated with various size estimates for this population is shown in Table.

Table 1

STANDARD ERROR OF ESTIMATE

Size of Estimate	Standard Error
5	8
10	11
20	15
50	24
100	34
250	54
500	76
1000	105
2500	140
5000	209

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*Single copies of these publications will be sent, at no charge, upon your request to the Research Coordinating Unit for Vocational Education, University of Minnesota, Minneapolis, Minnesota, 55455. The other publications are available in either hard copy or microfiche from Central ERIC.